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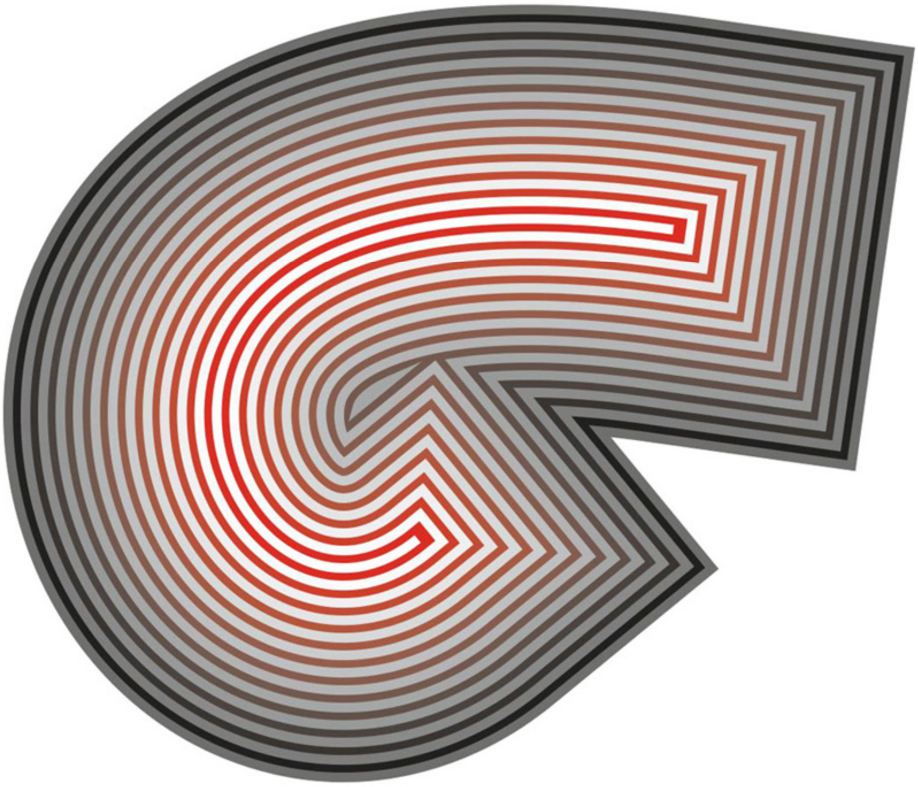

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SOCIAL NETWORKING WEBSITES: NEW EDUCATIONAL SPACE

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Over the latter decade the spread of information communication technologies was going on in various directions. Technological possibilities grew up very significantly (Lamanauskas, 2011). Especially rapid was the development of the internet and technologies related with it. A lot of internet service providers occurred in the market, their number still continues to grow. The internet link methods change - from the ordinary usage of phone line modems (dial - up) to broadband internet technology (DSL) and cable TV internet nets. It can be asserted, that over the mentioned period Web 1.0 internet (static, used for getting information) was changed by Web 2.0 internet (social). The internet diaries, social portals, technologies allowing live communication on the internet (Internet Relay Chat, IRC), talk programme Windows Live Messenger (MSN), ICQ forums and other have occurred and are spreading. With the occurrence of "Skype", internet telephony acquired a qualitatively new characteristic and practically became a daily routine. Thus, today a consumer can create his profile on the internet, can make friends, communicate in the interest groups and so on. It can be stated, that every human being in his own way contributes to the internet and at the same time to ICT development, in general. It is obvious, that together with technological problems arise social internet problems as well. Social networking websites (SNW) are closely related with economical, psychological, educational, valeological and other aspects. There is a lack of researches based on socio-educational social networking website aspects. It is important to know not only how much time the consumers spend surfing the net, but how much time is allotted for communicating in social networking websites, which of them are the most popular and why, how the respondents evaluate social networking website functions, what in general they know about them, what advantages, disadvantages and threats they discern. Finally, it is important to find out whether usage of social networking websites makes information – communication abilities better in any way.

It is obvious, that usage of social networking websites is constantly growing. In Lithuania, a rapid growth of usage has been observed in recent years, taking into account local (national) social networking websites as well. Facebook.com is one among 10 mostly visited networks in Lithuania. Lithuanian consumers are not an exception – not a small part of them also use several social networking websites. Both in the world and in Lithuania, business takes an active interest in social networking websites. An evident tendency is the expansion of SNW possibilities in business environment. If earlier it was thought that usage of SNW is a waste of time, in the latter years business finds more and more reasons why social networking websites ought to be used. This is marketing, service and product advertisement, new client search, cooperation development and so on. The other thing – the amount and the flow of information will certainly not decrease and therefore information usage and management in general, will remain urgent.

The other tendency is also rather distinct. Social networking websites "move" into educational space as well. However, a great number of problems exist here. Nowadays teachers (speaking especially about Lithuanian situation) are not properly prepared in ICT field. Though ICT usage competences are being improved in general, however considerable gaps remain, the shortage of understanding is felt on how to apply information technologies, what their abilities are to make teaching/learning process easier, more effective and interesting for children. ICT in its own way changes rapidly, it is complicated to adjust to existing technological environment. On the other hand, nowadays children have grown up in ICT surroundings, in the environment more or less filled with technologies. This makes them more susceptible to technologies in general. Thus, teachers' society can't stay behind from ICT development either. Teachers themselves have to be ready for unpredictable future (or at least hardly predictable) and to convey this attitude to children. A continuous demand to improve becomes the cornerstone for every member of society.

The problem of motivation to learn and improve remains urgent. Despite education science achievements, motivation encouragement problem remains one of the most serious ones. However, watching children and teenagers' activities using ICT, especially social networking websites, a very high motivation, a demand to use SNW are fixated. Thus, it is important to use up that motivation in educational sense, in other words, to use up social networking websites abilities in educational sense. It is already a common and understandable thing in itself to speak about higher technologies in industry, medicine, pharmacy, agriculture and so on. Somehow it is spoken very little or not spoken at all about higher technologies in education (pedagogy of higher technology).

Nowadays a lot of various social networking websites (or technologies devoted to creation of social networks online and their effective usage) are used not only for entertainment, leisure or communication, but for teaching/learning purposes. E.g., in business field enterprises and organisations, there is a well known internal learning and informing system, using which one can operatively convey information, news and so on (Intra Organizational Learning, IOL).Very widely are used the systems devoted for raising professional qualification both of teachers and students and in some cases for acquiring education as well (Formal Structured Learning, FSL). Speaking about social networking websites, a very significant becomes so-called accidental/spontaneous learning. This occurs when a consumer using social networking websites gets or finds out something new very often not realizing consciously it himself (Accidental & Serendipitous Learning, ASL). It is without doubt, that modern SNW in a certain sense realize accidental learning. Teacher's role continues to be problematic. It remains an open question to what extent technologies can overtake the teacher's roles of being a mediator and a human being; and this is indispensable since such a mediation generates students' cognitive and social processes and is a highly important factor for the whole learning process (Bregant, Aberšek, 2011).

Thus, can social networks carry out effectively educational function? Can they become a proper professional development instrument? We can formulate a lot of questions. The phenomenon of social networking websites is new and complicated, rapidly changing. The term itself "social networking websites" is rather new (2004). Quite often this term carries in itself a negative meaning. Not in vain, speaking about educational value of social networking websites, another term is used – (Educational networking, http://www.educationalnetworking.com/). The fact is that in the global world self-management learning becomes a distinct tendency in the field of cooperative teaching and teaching in general. Social networking websites and their technologies not only form proper conditions for such learning but also directly encourage it. It can be bravely stated, that the first social networking websites wave has already come down. Social networking websites creation, development and usage strategy is being thought in a new way. Educational social networking websites value remains a problematic and open question.

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IMPLEMENTING E-LEARNING ENVIRONMENT IN REAL VOCATIONAL SCHOOL

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Abstract

Students in vocational schools in Macedonia are less motivated and both enter and finish with ever decreasing knowledge. Teachers are still keeping to conventional ways of teaching. How to improve this situation? Is it possible that a Moodle eLearning environment will do this? The project, by itself, will lead to easier communication between students and teachers, 24-hour support for the students learning needs, modern e-learning and improvement of the teachers Information and Communication Technology (ICT) competences. With implementation of this educational plan, both teachers and students will increase their use of ICT (e-tests and quizzes, online teaching, preparation of electronic multimedia lectures) and improvement of the group and team work among teachers and students as well. In surveys, teachers and students confirmed that they want to be trained to begin to use the eLearning environment, and underwent training. Also, video tutorials are prepared for that purpose. The results can be seen through observations and interviews in which students are asked if this project started to improve their knowledge skills and whether teachers have started to prepared electronic resources and activities for them.

Key words: *eLearning, ICT, moodle, teachers, school, students, surveys, vocational.*

Introduction

Vocational Education focuses on achieving skills and knowledge necessary for real-world industries. In vocational schools students gain practical experience, develop and improve entrepreneurial and employability skills and many others. But students in vocational secondary schools in Macedonia are less motivated and both enter and finish with ever decreasing knowledge. Most of the teachers still retain conventional ways of teaching.

For many years are discussed about new technologies in teaching and how teachers accept it. "Professionally we are a conservative folk. We are only too willing to keep on, in our old ways. But we are also a profession with a conscience of some sensibility. Most of us want to be up to date in our methods, and young teachers are particularly keen to keep abreast of all the latest educational developments. They are always on the look out for some new thing, and their early career is sometimes marked by a surprising series of quick changes. Changes of point of view and of method during a teacher's career give evidence of vital force. The man is not stagnating. Each change as it occurs is an indication that he is reacting on his own environment, modifying it to meet his own needs and the needs of his pupils, behaving, in fact, as a healthy organism should." (Adams, 1923).

The NMC Horizon Report: 2011 K-12 Edition talks about new technologies and their use in learning, teaching and creative expression within the secondary education. "Those who have the opportunity to learn technology skills are in a better position to obtain and make use of technology than those who do not. The perceived value of innovation and creativity is increasing.” (Johnson, Adams, Haywood, 2011).

What about the learning styles of students?

Vermunt (1992) talks about various learning styles: a reproduction, an application and a meaning directed learning styles and also an undirected learning style. A reproduction directed learning style is characterized by reproducing study behavior of the students. Students characterized by an application directed learning style prefer to learn within actual, real-world. Students with a meaning directed learning style want to understand study material and try to develop their own view. Students with an undirected learning style have a lot of problems with study materials and they need more time.

The Dunn and Dunn (1999) model identifies visual, auditory and kinesthetic or tactile learners. Visual learners better learn through pictures, charts and other visible material. Auditory learners are usually talkative, they learn through dialogue and prefer discussions and debates. Kinesthetic learners want to touch, move and do things with their own hands. They may stay without concentration if there no external stimulation or movement (Prashnig, 2004). Usually, all three ways are used by any individual, but one is dominant. According to Edgar Dale (1969), a man learns 10 % of what he reads, 20 % of what he hears, 30% of what he sees, 50% of what he both hears and sees, 70% of what he discusses with others, 80% of what he experiences himself and 90% of what he teaches to someone else.

In this research, a main theme is how ICT can create new learning environments and changing their role from a teacher-centered to a student-centered environment. Teachers change their role from main source of knowledge and information to that of a collaborator, coach and co-learner. Students would be actively involved in different activities and can choose their own learning style, and also where and when to do that activities. Past few years has proved that efforts for quality education and equal educational opportunities for all, must be supported by reforms in education. “Teachers must have access to adequate training and ongoing professional development and support and be motivated to use new teaching and learning methods and techniques.” (UNESCO, 2005).

The main purpose of this research is to improve the success of students and to be able to find their own style of learning, and also, to move teachers away from conventional ways of teaching by using ICT. It can also be said that less and less students are enrolling in vocational schools from year to year. So this research, design and development of eLearning environment should indirectly contribute to the good publicity of the school and increasing the number of students who enroll in the school.

Methodology of Research

In 2008, the project “Computer for Every Child” began by the Ministry of Education and Science of FYR Macedonia and by 2011 almost every school got computer with internet for each student. Also, at the vocational school where this research was done, almost every student has a computer and internet at home. But how are the computers used? How to engage students with the possibilities of ICT, but in learning activity, not just in recreational? Would the use of a virtual learning environment such as Moodle make the learning more exciting and also make the teaching more interesting? When ICT is integrated correctly, it is able to motivate teachers and students, gives the students real-world skills and help them to learn how to get better learning experiences and be productive members in 21st century.

As this research includes Moodle, let see what kind of learning environment is it. “Moodle is the perfect platform for experimenting with new and emerging technologies, applications, and tools. Moodle is a Course Management System (CMS) for producing web-based courses. A course that has been built in Moodle encourages learners to engage with the material on many different levels. Learning takes place in many ways and in many places, and above all, there is a built-in flexibility that allows the learner to approach the material in ways that work for him/her. Keep in mind that each learner has his/her own style, and the best learning programs accommodate learning styles and preferences. So, whether or not the participants in the course are auditory, visual, or kinesthetic learners, they must be taken into consideration, and the instructional activities as well as assessments should reflect those possibilities. Learners have options, not just with the course content but also in the approach they take to the material and to their peers."(Rice, Smith Nash, 2010).

The project, by itself, will lead to easier communication between students and teachers, 24-hour support for the students learning needs, modern e-learning and improvement of the teachers IT competences. In 2010/2011 school year, the first virtual learning environment of the school host was created as a subdomain on the web site: http://e-learning.gorginaumov.edu.mk. That was a first step, more like a test or experiment. Electronic materials and some activities were prepared for students in several courses and students were satisfied with the changes. All teachers had possibilities and access in their courses, but there was no initiative from their side. This emerged the question: How to improve this situation?

So in 2011/2012 school year was developed a research plan, followed by creating a new subdomain http://e-uciliste.gorginaumov.edu.mk. This research includes 2 initial phases. The first phase (more like a preparation phase) included one teacher who prepared electronic multimedia lectures, quizzes and other activities for their own students in second quarter from the first half of the school year, after weak first grades in first quarter. These activities were prepared for 2 classes with 63 students in 3th year (subject: Digital Systems), and for 3 classes with 82 students in 4th grade (subject: Process Control), or total 145 students. Some of the prepared lectures, quizzes and other activities can been seen at http://tinyurl.com/8a3cezr.

After a generally successful first phase, the second phase followed where Moodle was organized for all 71 teachers (see on http://tinyurl.com/6ry3qtw) and for all 792 students in the school. In this phase, after organizing Moodle, via surveys, both teachers and students were asked if they want to be trained, and to begin to use the eLearning environment. Both surveys were in native language, for the students (http://tinyurl.com/753rh8p) and for the teachers (http://tinyurl.com/7durqyk), and was created by Form in Google Docs.

The survey for the teachers was answered by 50 teachers. There was 17 questions in survey, but 9 of them were particularly important for this research. For example: "2. Does the abundance of resources and relationships which are easily accessible via the Internet increase the challenge for us to review our roles as educators?", "3. Do you think ICT profoundly affect the way we work, collaborate, communicate, and succeed?", "5. Does the use of ICT stimulate innovation, creativity, interest and motivation among students?", "7. Would you use the possibility of making electronic quizzes (tests) that can be used for formative assessment at the end of the lesson or at any time, but also for the final assessment?", "10. Would you like to attend a short training for using ICT with your students in which you learn to create materials in electronic form, make quizzes of varying difficulty, duration and time, create assignments for students different tasks, using video conferencing and so on, which will then be made available 24/7?" Some of the questions in the surveys were provoked by Johnson, L., Adams, S., and Haywood, K., (2011). The survey for the students was answered by 213 students (8-10 of each class, not including the 5 classes from the first phase). There was 17 questions (similar with that of a teachers survey, but prepared for students), and 8 of them was for this research. Some of the questions were: 2. Does ICT should profoundly affect the way you work, collaborate and interact with teachers? 3. Would it increase your motivation and interest if you are able to work, learn and solve problems at anytime and anywhere, not only at the classes? 5. Do you think that by using electronic (doc, ppt, pdf etc) or multimedia lectures, available 24/7, that this would increase your interest and motivation? 7. Would you like to try some extra or additional classes to hold through video conference if it is provided by the school? 8. Do you think that the use of ICT in ways that are mentioned in the above questions would raise your skills and achievements as a student?

The importance of this research can be seen by an analysis of grade results of students in the two previous school years. In 2009/2010 school year, from 884 students with 256 in 1st, 218 in 2nd, 206 in 3rd and 204 in 4th year of study, the success at the end of the school year was as follows: 104 students completed with a grade average of 5 (highest), 96 with 4, 245 with 3, 431 with 2 (passing) and 8 with 1 (fail). So the average grade was 2.84. In 2010/2011 school year, from 813 students with 184 in 1st, 247 in 2nd, 210 in 3rd and 172 in 4th year of study, the success rate was: 80 students completed with 5, 103 with 4, 218 with 3, 397 with 2 and 15 with 1. So the average grade was 2.80. In 2011/2012 school year only 171 students were enrolled in first year of study. From this, it can be seen that both the success and the number of students enrolled in first study year is continuously decreasing. As we said above, research has shown that this improvement can come when students find their own learning style. To do this teachers must provide and use new teaching techniques for students both while in school and via the eLearning platform. This will positively affect more and more students each year as the eLearning platform expands and more and more teachers participate.

Results of Research

For the first phase, the research took place within the school's classrooms with computers and internet, and also with online students' activities at home, for students of the five already mentioned classes. The grades of the students for the first half of the school year (at the end of December 2011) compared with grades at the end of first quarter (at the end of October 2011) were pretty much satisfying. At following link: http://tinyurl.com/7263upj, grades of all students can be seen as taken from the electronic grade book (names of the students are blurred according to the law on protection of personal data in our country). These results in percentage are shown on figure 1.

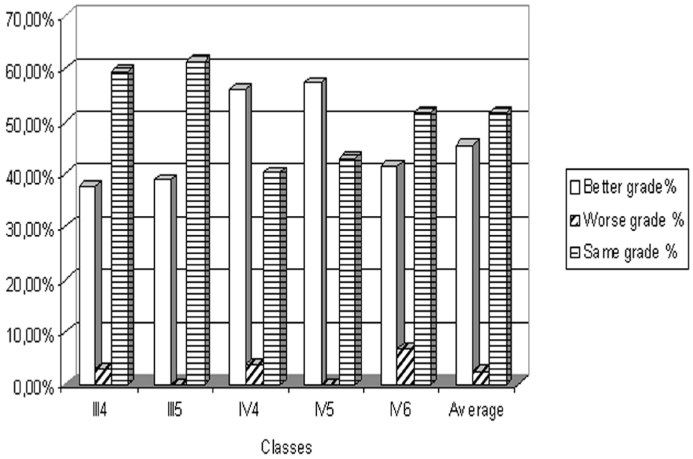

Figure 1: Results of the students' grades in 5 classes for the first phase of research.

In the second phase, after organizing Moodle, in surveys, teachers and students confirmed that they want to be trained, and to begin to use the eLearning environment.

Results shows that about 80% of surveyed teachers wished to attend the training to use the Moodle platform. This is shown on Figure 2, for every question from the teachers' survey. Original results (in Macedonian) can be seen at http://tinyurl.com/73o6rur.

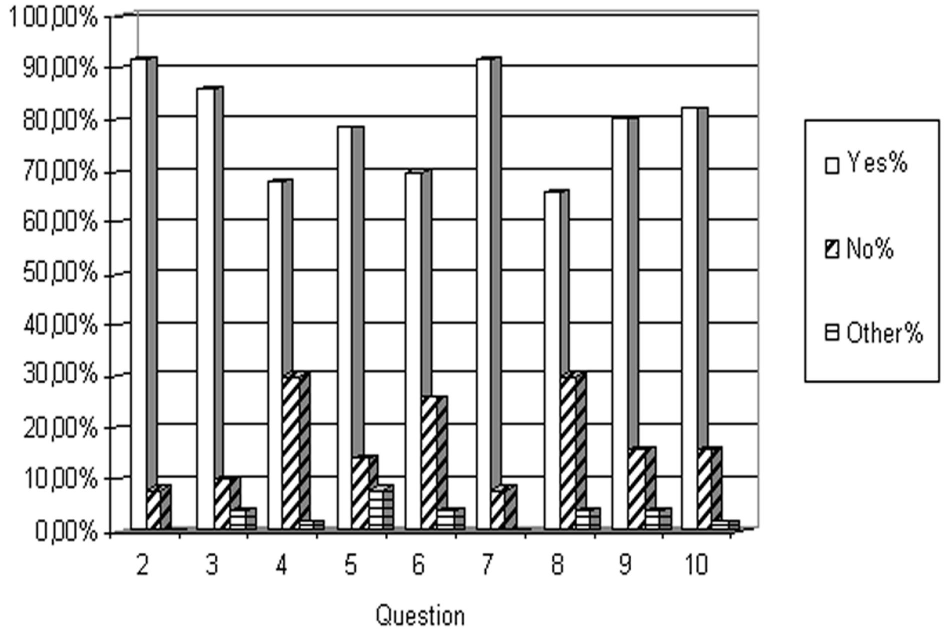

Figure 2: Results from the teachers` survey.

Results shows that about 80% of surveyed students wished to use the Moodle platform. This is shown for every question on Figure 3. Original results from the students can be seen at http://tinyurl.com/7ldnavj.

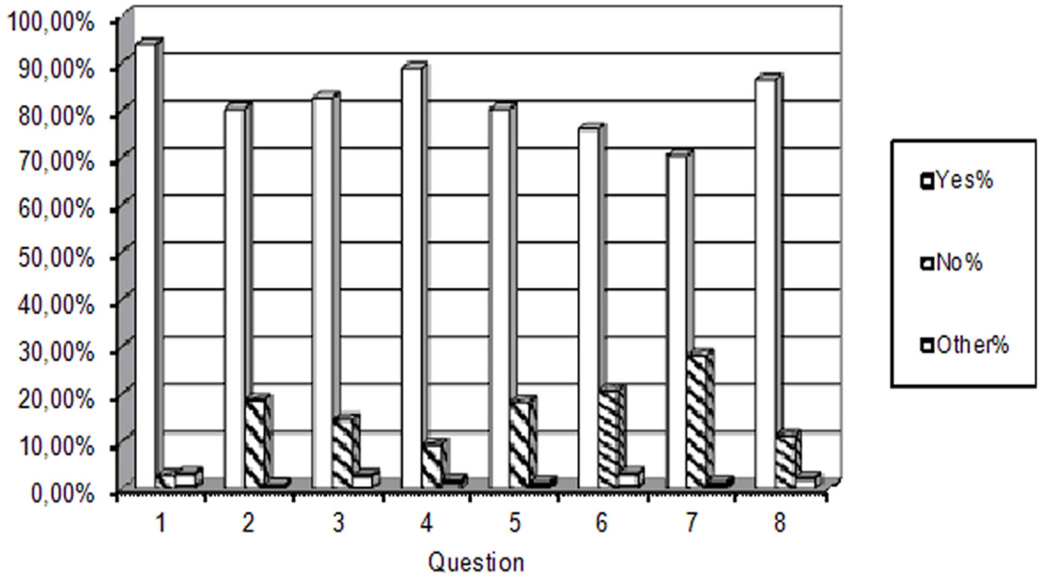

Figure 3: Results from the students` survey.

Discussion

In the first phase in almost all classes, over 37% to 57% of the students have better grades than their first grades, 45.52% of all students have better results, and 51.72% have the same result (Figure 1). We believe that these results can be improved with greater engagement and innovation by the professor.

After concluding that about 80% of surveyed teachers wished to attend the training to use the Moodle platform (Figure 2), and that about 80% of surveyed students wished to use the Moodle platform, training has been organized. Three groups of 20 teachers each, attended training in January 2012. Tutorials were prepared in written and video format. Video tutorials can be seen at http://gorginaumov.edu.mk/?page_id=1684. Also, tutorials in written format can be seen at http://www.issuu.com/ilceacevski/docs/online_uciliste. In these tutorials, also, are electronic multimedia lectures, quizzes and other activities prepared for the first phase of this research, organization of Moodle and so on.

But maybe the most important thing is that this eLearning platform can be used by the students at home and not only in the school. In the student's survey, 93.90% of students answered that they have computer with internet at home, which is very similar with average across OECD countries, where 94% of students reported that they had a computer at home. In OECD (2011) might be seen comparison between PISA 2000 and OECD research in 2009. For example, the number of students who confirmed at least one computer at home increased from 72% in 2000 to 94% in 2009. Also, the opportunities for 15-year-old students to access the Internet have improved dramatically, from 45% to 89% between 2000 and 2009. In research from 2009, 93% of students answered that have access to computers connected to the Internet at school. Macedonia may be a leader in this field (in primary and secondary education) with almost 100% since 2010, as it was mentioned above. Now the question is how these computers to be used for the right purposes. It is the main goal of this research.

What about teacher training? Yves Punie, Dieter Zinnbauer and Marcelino Cabrera, (2008) in research for European Commission find that “The need for teacher training is widely acknowledged. Teachers, trainers, and other learning facilitators have to be given the knowledge, examples and time to “adopt” ICT in their daily practice. One of the problems is that today's teachers need to learn to teach with digital technologies while many of them have not been taught to do so. This report also find that most of case studies highlight positive impacts of teacher training with digital technologies, such as increasing teacher confidence and competence in the use of IT resources by providing them a good training. Training teachers to use digital technologies could also include the use of ICT for assessment of learning outcomes, although teachers are not the only actors concerned with assessment. Assessment is indeed central to educational practice and performance. There is good research evidence to show that well designed assessment systems lead to improved student performance.”

Conclusions

Conclusions here are based on the visible results within the Moodle itself and on interviews with teachers and students. It can be seen that some teachers are beginning to put electronic materials that were prepared earlier into the learning environment to be freely available to students. Some of the younger teachers have even begun to prepare assignments, quizzes and other various activities for students.

Also, from the interviews with students, we see that they believe that by using the Moodle platform that they will improve their learning skills and their knowledge. They also say they are more motivated and interested and that they hope that over time more teachers will begin to use this platform. They have found that in a variety of electronic and multimedia lectures and activities, each student can find their own method of learning and their own learning style.

It is still early to say that this project has finished 100% successfully because the actual results of the overall project will have to wait at least a year, maybe more. During that time, there must be other activities which directly or indirectly encourage teachers to change the way they work and to gradually change their role from teacher to coach or mentor, and thus to increase their competencies in these directions.

Because it is a vocational school, in the future much work can be done on how to incorporate video conferencing into the platform. Teachers would then be able to arrange online meetings between experts in certain areas and their students. It also could include portfolios for students and their activities and various workshops. It will bring improvement of group and team work between teachers and students. Preparations for these activities are already underway.

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FEMALE FACULTY MEMBERS IN THE FIELD OF ELECTRICAL AND COMPUTER ENGINEERING: THE CASE OF GREEK UNIVERSITIES

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Abstract

Issues concerning the presence and professional development of women in the academic world have occupied the social sciences since the 1980s. The purpose of this study is to trace the presence and prospects for professional employment and development of women faculty members in the field of Electrical and Computer Engineering (E.C.E.) in the case of Greek universities, at the start of the 21st century. Sources for this research were women who teach in E.C.E. departments in Greek universities. The research data come from phone interviews with female professors who work in the E.C.E. departments, and from information drawn from the secretary's offices and the websites of the specific departments. The most significant research findings revealed that in the field of E.C.E. in Greece, the social structural difference between the sexes still survive. This fact creates difficulties for the career progression and professional development of women, who also face difficulties in their work due to the commitments which are involved in the fulfillment of the demands of the role of mother. In addition, many of the difficulties faced by these particular women in their career result from the activating of prejudices concerning the female gender, which seems to be invading the 'male dominated' field of E.C.E. in the case of Greek universities.

Key words: *Electrical and Computer Engineering, female faculty members, Greece, universities.*

Introduction

The issues surrounding the presence of women in the academic world, as well as their professional development within it, continue to occupy the social sciences and in particular the field of 'women's studies' (see: Acker, 1992; Anders, 2004; Bagilhole, 1993; Enders, 2000; Forster, 2001; Hemmings, Rushbrook & Smith, 2007; O'Conner, 2008). Indeed, women's increased access to higher education after the end of the Second World War, at least in the case of the economically developed western world, resulted in their infiltration of previously male-dominated professional fields, such as the Sciences and technologies (Arnot, 2004, p. 369). Nevertheless, the infiltration of women into the domain of university teaching, is much smaller.

In Greece in particular, while during the academic year 2008-2009 out of the whole student population of 171,882 individuals, 65,564 were men (38.14%) and 104,318 were women (61.86%) (Sianou-Kyrigou, 2010:127), female Faculty members (F.M.) made up just 28% of the total of teaching staff at Greek universities (Anastasaki, 2007; Maragkoudaki, 2008) and were to be found at lower levels of the academic hierarchy (Vosniadou & Vahiou, 2005). Very similar is the picture of female F.M. internationally, where it has been found that their numbers in the fields of the Sciences and of Engineering and of Information and Communication technology are small, while it is also true that many women who work in these particular fields often face discrimination based on their gender (Walsh & Osipow, 1994, p. 15-16). Besides, career progression in the university world always possessed an elitist character as far as its culture, structure and values were concerned and appeared to better suit the choices of men (Poole, Bornholt & Summers, 2006). More specifically, as far as the field of the technologies is concerned, the views and positions of the two sexes differ, due to prejudices about their differing roles, making women's access to that field more difficult (Berggren, 2008; Kusku, Ozbilgin & Ozkale, 2007). To explain this particular phenomenon Robinson & Mcllwee (1991) use the term '*culture of engineering*' which links masculinity with the machine as much in the various fields of work as in the case of university research and teaching. This fact, according to Seymour (1995), seems to have a negative effect on women's choices and distances them from the fields of the sciences and the new technologies.

A study of the scientific bibliography reveals a lack of recent studies which investigate in depth the participation of women as F.M. in 'male-dominated' academic fields in Greece, such as the field of the New Technologies, as well as the factors which influence the course of their academic career and the difficulties they face in their attempt to progress (see: Anastasaki, 2007; Eliou, 1994; Kontogiannopoulou-Polydoridi, 1995; Maragkoudaki, 2008; Vosniadou, 2005).

The purpose of this study is to trace the presence and prospects for professional employment and development of female faculty members in the field of Electrical and Computer Engineering (E.C.E.) in the case of Greek universities, at the end of the first decade of the 21st century. In addition, it is also important to investigate the extent to which their gender constitutes an obstacle to women's upward mobility in the university field of E.C.E., as well as in the assumption of administrative positions within the universities. This is because it is professional occupation and specialization which constitute the basic elements which determine gendered social relations (Maruani, 2006; Molinier, 2003; Siann & Callaghan, 2010).

The study begins with the theoretical framework, which makes use of Bourdieu's conceptual model. In particular, the concepts 'academic field', 'academic capital' and 'habitus' will be used. Next, the research questions and the methodology used are defined. The "Quantitative and Qualitative results" gives a full description of the upcoming results of the study. Then the "Discussion" section discrabes the findings within the theoretical framework. Overall conclusions of the study are summarized in the "Conclusion" section.

Theoretical Framework

Bourdieu (1980) sees the social world as made up of various microcosms which he calls 'fields'. The concept of the field allows us to conceive of social reality in terms of relations. From this point of view, a field is a 'trend' or 'network', objective relations between 'positions' (Bourdieu & Wacquant, 1992, p. 72). The positions held by the agents in the field depend on the distribution of the various forms of capital which they possess. A field could also be understood as a structured space for social powers and struggles which resembles a game in which players who believe in it and in its stakes, take part (Accardo & Corcuff, 1986, p. 86; Acker, 2010; Bourdieu, 1980, pp. 113-114; Grenfell, 2007, p. 60). The concept of the academic field is a derivative of the concept of the field and consequently is a matter of a system of objective relations among vested interests which have their origins in a struggle and whose sights are set on securing a monopoly of the academic prestige, which is comprised of a particular form of capital, which is the academic capital. It is a 'social microcosm', a 'game space' which is governed by interest groups, power relations, strategies and social relations of domination, while at the same time, as a social space it exerts forms of coercion (Bourdieu, 2005, p. 26-27).

The concept of academic capital is based on the accumulated knowledge which the social agent possesses within a particular academic field and in the recognition of the rules which are applied within the field on the part of the participants (players), who take part in the games within the field. According to Bourdieu (2005, p. 31), it is a matter of a 'particular kind of symbolic capital', which is composed of, and shaped by, 'the recognition of fellow players' who are at the same time opponents in the game, and is determined by the following two forms a) the 'pure' scientific capital, which corresponds to and is dependent on the recognized contributions to science (mainly papers) and b) the 'institutional' scientific capital, which is acquired and accumulated within a political and strategic whole and which concerns participation in conferences, committees, symposia, ceremonies and so on. The two particular forms of capital correspond to two kinds of power within the academic field; a power of 'personal prestige' and an 'institutional' power, which has to do with participation in the administrative mechanisms of power (Bourdieu, 2005, p. 42-43).

The result of the scientific struggle within the academic field and the position that the socially active agent will occupy therein, depends as much on the accumulated scientific capital that he possesses as it does on his 'dispositions', which Bourdieu (2005) calls habitus. It concerns, in other words, the 'permanent and continuous modes of existence' of the social agents who also produce their practice. More specifically, Bourdieu points out that if the agents' intentions do not correspond to the demands of the field, then there is a possibility that they will find themselves either in a 'bad position' within the field or 'out of play', in other words, outside the field (Bourdieu, 1980, p. 88-89; Bourdieu, 2005, p. 34; Maton, 2008, p. 51).

Bearing this in mind, the successful entrance into, and the academic development and career progression of female F.M. within the 'male-dominated' academic field of E.C.E. depend as much on their initial scientific capital as they do on the continuous amassing of scientific capital which ensures scientific recognition and scientific prestige (Bourdieu, n.d., p. 96). This in turn is entirely dependent on the amount of time a female F.M. who works in the academic field of E.C.E. has in contrast with her male colleagues. It also depends on the women's internalized disposition (habitus) and on the capacity of the particular dispositions to respond to the demands of the 'male-dominated' academic field. Women's dispositions, however, may well not facilitate the gathering and formation of scientific capital, which is explicitly demanded, in order for them to be able to attain a position within the particular field. In other words, what is not facilitated, is their entrance into and professional development within those social spaces (fields) which are defined by their masculinity, as is the academic field of Electrical and Computer Engineering (Bourdieu, 2007, p. 115).

In order for a woman to attain a position of prestige as a social agent, such as a university position in the field of E.C.E., she would need to have a series of skills which are normally possessed by the male holders of such positions and which are formed through a kind of silent preparation (the shaping of their own habitus) according to their gender (Bourdieu, 2007, p. 164-167). As far as the gender factor is concerned, Bourdieu claims that there is a symbolic opposition which is easily discernible in European societies, which are dominated by male values, and which destine men for politics, science and war. It is a matter, in other words, of an identification of masculinity with domination, prestige and high status, while on the other hand women are destined for the fields of the household, literature, psychology and the humanistic sciences (Arnot, 2004, p. 95).

Methodology of Research

The following research questions were explored in this paper:

(1) What is the gender based composition of the teaching and research staff in the academic field of Electrical and Computer Engineering in the case of Greek universities?
(2) What are the prerequisites for entry into and hierarchical development within the field of E.C.E. in Greek universities for female F.M.s?
(3) What difficulties do female F.M.s face in their academic career progression in E.C.E. in Greek universities?

In order to answer the first two questions, data were drawn from the websites and secretary's offices of the E.C.E. departments of Greek universities, concerning the presence, position, scientific constitution and academic progress of female F.M. In addition, in order to investigate aspects of the second question and to answer the third research question, telephone interviews were conducted with female F.M.s in E.C.E. Departments.

Participants

12 out of a total of 23 female F.M.s in E.C.E. Departments at Greek universities responded to telephone interviews. Of those, 8 women (67%) were married and 4 (33%) were unmarried. In addition, 2 women were professors (25% of the total number of female professors), 4 were Associate professors (100% of the total number of women at this level), 3 were assistant professors (50% of the total number of women at the level of associate professor) and 3 were lecturers (60% of the total number of women at the level of lecturer).

Methods

The method of telephone interviews was used for two main reasons: a) due to the great geographical distance between the universities which have departments of E.C.E., it was difficult both financially and in terms of time for researchers to have access to them, and b) since in a telephone interview there is no visual contact between interviewer and interviewee this makes it easier to broach issues which could be considered 'sensitive', and also permits the research subjects to speak more freely on these issues (Mertens, 2009, p. 243-244; Robson, 2007, p.221-335; Sturges & Hanrahan, 2002, p. 108).

Data Analysis

In the chapter of the research results the quantitative and qualitative analysis of gathered data are presented. More specifically, in the section of the quantitative results the elaboration of the collected data from the websites and secretary's offices of the E.C.E. departments of Greek universities are shown. Also, the qualitative results drawn from the phone interviews are presented in the second part of the results.

Results of Research

Quantitative Results

Table 1 presents the distribution according to gender and university institution of F.M.s working in Departments of E.C.E. in Greek universities during the academic year 2010-2011.

Table 1. Faculty members in the Departments of Electrical and Computer Engineering in Greek Universities in the academic year 2010-2011 (N/%).

Universities	Men	Women	Total of F.M.
National Technical University of Athens	83/89.9	9/10.1	92/100
University of Thessalonica	41/93.2	3/6.8	44/100
University of Patras	44/91.7	4/8.3	48/100
University of Thrace	43/87.8	6/12.2	49/100
Technical University of Crete	24/96.0	1/4.0	25/100
Total	235/91.1	23/8.9	258/100

Table 2 shows Faculty Members working in E.C.E Departments of Greek universities during the academic year 2010-2011, according to gender and grade.

Table 2. Faculty Members by gender and grade, in the Departments of Electrical and Computer Engineering of Greek Universities for the academic year 2010-2011 (N/%).

Grade	Men F.M.	Women F.M.	Total F.M. in the grade
Professor	123/93.9	8/6.1	131/100
Associate Professor	45/91.8	4/8.2	49/100
Assistant Professor	48/88.9	6/11.1	54/100
Lecturer	19/79.2	5/20.8	24/100
Total number of F.M.	235/91.1	23/8.9	258/100

A study of the results in Table 2 reveals that the percentage proportion of women among F.M. of the same grade drops as we proceed from the lower towards the higher grades in the educational hierarchy. More specifically, on examining the proportion of F.M. at each grade, we observe that the women working in the E.C.E. Departments at Greek universities during the academic year 2010-2011 are to be found in the lower educational grades (Lecturers 20.8% and Assistant Professors 11.1%). Furthermore, the 8 women who were working at the level of professor were to be found only in the corresponding Departments of the two oldest Greek universities, the National Technical university of Athens (6 female professors) and the University of Thessalonica (2 female professors). In addition, all the Associate Professors were to be found at the University of Thrace.

Table 3 shows the distribution by grade of female F.M. according to the entry requirements of the academic field of E.C.E.

Table 3. Entry requirements for female Faculty members in the field of Electrical and Computing Engineering in the academic year 2010-2011 (N/%).

Grade	F.M. in the grade	Postgraduate Studies abroad	Doctoral Thesis in the same Department	Prior work relationship with the University
Professor	8/100	5/62.5	3/37.5	1/12.5
Associate Professor	4/100	2/50.0	1/25.0	1/25.0
Assistant Professor	6/100	3/50.0	3/50.0	3/50.0
Lecturer	5/100	2/40.0	3/60.0	2/40.0
Total number of female F.M.	23/100	12/52.2	10/43.5	7/30.4

From a study of the results in Table 3 it emerges the following:

1) The majority of female F.M. in Departments of E.C.E. has completed postgraduate studies abroad (12 women, 52.2% of the total number of female F.M.). In fact, the majority of women who complete postgraduate – and in particular doctoral – studies abroad are to be found at the top of the education hierarchy, in other words, at the level of professor (5 individuals, 62.5% of the total number of female professors). In addition, half of the women to be found at the levels of Associate and Assistant professor studied abroad. From a study of their Curricula Vitae we can conclude that their studies abroad, as well as their research and teaching work in foreign universities contributed to the appointment of 4 out of the 12 female F.M. directly to the position of Assistant professor, bypassing entirely the grade of lecturer. This is because these particular women attained high level academic qualifications, in other words, 'pure' academic capital which opened the door for their entry into the male-dominated academic field of E.C.E.

2) A second significant factor which appears to have favoured the entry of the majority of the women who are today F.M. in the Departments of E.C.E. at Greek universities, is the preparation of a doctoral thesis within the department to which they were then appointed (10 teachers, 43.5% of the total number of female F.M.). The majority of female F.M. in this category are to be found in the two lowest grades of the educational hierarchy (6 individuals, 54.5% and more specifically: 3 lecturers, 60% of female lecturers and 3 assistant professors, 50% of the women at this grade). And,

3) The prior work relationship of the majority of the female F.M. as assistants or research partners in the Departments of E.C.E. helped their entry into the sector of teaching staff (7 teachers, 30.4% of the total number of female F.M.). This factor is closely connected to the preparation of a doctoral thesis within the department that they work in today. This is because according to the transitions in the Law 1268/1982[1] for Greek universities, all those who, at the start of the 1980s, had permanent positions on teaching staff in the categories of scientific partner or assistant were given the opportunity, assuming they so wished, to be appointed to the grade of lecturer after receiving their doctoral title, and to follow a university career. What's more, even those assistants who did not hold a doctoral degree were permitted to prepare their doctoral thesis in the Department of E.C.E. of the university where they were working.

Table 4 presents the distribution by grade of female F.M. working in E.C.E. Departments during the academic year 2010-2011 according to the factors of age and career progression.

Table 4. Career progression of female Faculty members in the field of Electrical and Computer Engineering in Greek Universities in the academic year 2010-2011.

Grade	Average age (years)	Average length of time spent working in the same grade (years)	Average length of time before promotion to next grade (years)
Associate Professor	53.5	8.0	7.0
Assistant Professor	50.2	9.5	6.8
Lecturer	45.6	6.6	6.9

From a study of the results in Table 4, we conclude the following:

1) The average ages of 45.6 and 50.2 years old which correspond to the women at the level of lecturer and assistant professor respectively, are high. In addition, the difference in the average ages of female F.M. between the introductory grade of lecturer and the grade of associate professor is 7.9 years, relatively small in other words, and approaching the minimum

time limit for progression from one grade to the next. It should be pointed out that, based on the current legislative framework for tertiary education in Greece which applies to the academic year 2010-2011, the period of service for a lecturer was seven years and the minimum length of service necessary before one could request promotion to the next level was three years. Moreover, the period of service for an assistant professor is three years and a teacher, after attaining permanent tenure at this grade at the end of the three years, could request to be promoted to the grade of associate professor. Finally, a teacher could request that the promotion procedure for her appointment to the grade of professor be started only after the completion of three years of service at the level of associate professor. Our findings concerning the average age by grade, as well as the difference in average ages between grades in the educational hierarchy which concern female F.M. who work in Departments of E.C.E. in Greek universities can be interpreted as being influenced by two factors: a) the difficulty women face in entering the male dominated world of the academic field of E.C.E. This is because appointment to the grade of permanent lecturer for women who held the position of permanent assistant academic staff (5 out of the 11 female F.M. who are to be found at the two lower levels of the education hierarchy, 45.5%) and who could, thanks to the beneficial clauses of the Law 1268/1982, follow a university career, seem to have occurred only over the last decade, in other words hesitantly and with much delay. It is worth noting that for all this time – from the beginning of the 1980s until their appointment to the grade of permanent lecturer - these women were working as permanent assistant academic staff in their departments. The second factor b) is the direct appointment to the grade of assistant professor of women with very good studies and work experience abroad. Those women in other words who possess the vital scientific capital, which is further strengthened by the international recognition accorded to their scientific work.

2) The average waiting times of 9.5 and 8 years for female F.M. at the grades of assistant and associate professor respectively are high and reveal the difficulties for promotion to higher grades in the education hierarchy. In fact, we observe that these particular women remain in the same grade for a long period of time, approaching a decade. In addition it appears that some women are satisfied with this period of waiting in the grade of assistant professor and do not aspire to advance any higher in the university hierarchy. And,

3) Since a lot of female F.M. in the university field of E.C.E. are hesitant and do not dare to advance to the highest grade, the average length of time before they move up to the next grade for those who do decide to proceed approaches seven years. This is the highest permissible time limit a lecturer can choose before becoming eligible to move up a grade, because otherwise they are required to leave the university.

Qualitative Results

Difficulties which female F.M. face in the field of E.C.E. in Greece

The difficulties which female F.M. in the field of E.C.E. face focus mainly on two issues: a) the demands of an academic career due to the parallel demands of the role of the woman as wife and mother, and b) the existence of prejudices regarding the female gender which result in the unequal treatment of women in the academic field of E.C.E.

The demands of a professional career and the traditional role of women

From the answers of female F.M. in the field of E.C.E. there appears to be a dilemma between the choices of creating a family or pursuing a professional career within academia. A female F.M., at the grade of Assistant Professor, mentions characteristically:

> '*the most important difficulty that we face is the combination of family and work, since the family demands a lot of time as does work in this field'.*

Another female F.M. at the grade of lecturer adds:

> '*motherhood is a decisive factor which impedes women's activities at the University…'*

It seems, then, that there is a conflict of choices and women's attempt to move between personal space (creation of family – motherhood) and public space (work – career). As one female F.M. at the grade of Associate professor mentions characteristically:

> *'…this particular occupation has as a disadvantage for us as women the extreme exhaustion which is intense and many-sided and is not compatible with the demands of the family…the work conditions are very demanding….'*

In addition, the extract below clearly presents the intense concern of one female F.M. at the grade of Professor, regarding the creation of a family and following a career in a demanding and extremely competitive branch of science:

> *'…the most significant difficulty for me is the balancing of motherhood and work. When I became a mother, and in order to continue my academic career, I began to work from the first day on the maternity ward where my son was born…besides, there is a lack of support for working mothers, an absence of nursery schools…in general, the situation in Greece…it has to be said that the creation of a family is a great difficulty for women in the University….if truth be told, I often think of giving it all up but I like my job and I decided that I didn't want to get left behind'.*

The existence, then, of the dilemma motherhood/family or academic career reveals the existence of an internal conflict of roles on the part of female F.M., which is often noticeable in the phenomenon of the leaking pipeline.

Moreover, as far as appointment to administrative positions is concerned, the number of female F.M. who take up positions as Dean or President of Department is small. There are two women from the grade of Professor who took up these particular high administrative positions. In addition, out of the 12 women who participated in the telephone interviews 3 women had served as Head of department. In fact, the female F.M. in the academic field of E.C.E. consider their appointment to administrative positions as an additional difficulty and attempt to avoid it since it increases their workload. In addition, for some of them, the administrative posts are associated with the field of power from which they endeavour to dissociate themselves:

> *'…..objectively speaking, I can't take on an administrative position because I'm at a low level of the hierarchy, but even if I had the opportunity….I don't have time to combine writing, lessons, family and administration. There's not enough time….'* (female F.M. at the grade of Assistant Professor).

And again:

> *'…I'm not interested in administrative posts, they are positions of power and generally I am not, by nature, at all interested in power…'* (Female F.M. at the grade of Associate Professor).

A further problem which some female F.M. appear to face in the field of E.C.E. is their feeling of the difficulty if not their own inadequacy in creating the necessary scientific capital (pure and institutional) in order to move up to the highest levels of the university hierarchy:

> '*…you won't believe it, but in order to write a paper a few years ago, when the children were small, I left them with my mother and my husband and I went to a hotel for a week. It was impossible for me to write at home…'* (Female F.M. at the grade of Associate Professor).

What's more:

> *'...and then we have to take part in conferences. When they are in Greece it's not too bad, although even then it can be difficult. But abroad…that's a lot more difficult. Where can you leave the children? Difficult…very difficult. I believe that in order to be able to work properly in this field you have to work on a masculine level. For example, my married male colleagues don't have any problem going away to conferences…'* (Female F.M., Professor).

Prejudices and the approach to women in relation to the female role, in the academic field of E.C.E. in Greece

One significant difficulty which female F.M. face in their professional career in the academic field of Electrical and Computer Engineering in Greece, appears to be the prejudices and stereotypes regarding their gender. The women who do manage to enter traditionally male dominated and demanding areas of work, like the academic field of E.C.E., appear to experience unequal treatment, both directly and indirectly, when compared with their male colleagues:

> *'There are always 'indirect' doubts concerning the ability of a woman to meet the obligations of this work, so this ability must constantly be doubly confirmed in a very clear manner.'* (Female F.M., Associate Professor grade).

And still:

> *'.....there is the constant belittling of women who make up the minority in the specific field. Especially in meetings where the number of women is very small, say 3 or 4, they don't face a problem when they agree to everything. In other words they say 'yes, men'…'* (Female F.M., grade of Professor).

The unequal treatment of Female F.M. presents itself in various forms, like:

> *'...I'm under the impression that prejudices exist in the area of research funding, when it's women who practice the profession of electrical engineer for computers. And that's apart from the few grants for research and the lack of state support and funding for programmes…*' (Female F.M. Associate Professor grade).

Discussion

The presence of female F.M. in the Departments of Electrical and Computer Engineering in Greek Universities reveals the existence of horizontal discrimination in the academic profession concerning the concentration of women in the fields of Social and Humanistic Studies, Health Sciences and/or the Fine Arts and their scant presence and under representation generally in the sciences and in particular in the field of E.C.E. (Sianou-Kyrgiou, 2007). The same is true of the distribution of female F.M. in the four grades of the academic hierarchy. This fact reveals the existence of vertical discrimination in the academic profession as well, which results in women's increased participation only at the lower academic levels. These findings, which concern the field of E.C.E. in the case of Greek Universities, accord with the findings of other research which reveal a similar picture in the international field (Bagilhole, 2007; Bebbington, 2001). Thus, the academic field of E.C.E. in Greece does not appear to be particularly ‘friendly’ for female academics, since it retains a strongly gendered character which favours the career progression of men (Bourdieu, 2007, p. 172).

More specifically, from the interview excerpts ~~we~~ presented, it appears that female F.M. in the field of E.C.E. fight hard to manage to keep their academic posts – positions of prestige and power. In particular, Bourdieu (2005, p. 38) points out that the scientific struggle is an armed struggle between adversaries and the most important weapon required in order to take part in this struggle is accumulated scientific capital. However, women enter the academic field of E.C.E. in Greece with the ‘feminine habit’, a gendered habitus which is the product of a work of building, theory and practice. The natural and social order of the world, within the normalities of its operation, engraves dispositions and uses the biological differences between the sexes as a basis for social differences. Hence, as a natural consequence, women frequently face exclusion (at least to some extent today) from positions of prestige and power (Bourdieu, 2007, p. 64-65). The phenomenon of the leaking pipeline is characteristic. In other words, the premature departure of women from the academic field for the sake of their family commitments, constitutes a leaking of manpower from the academic tank (Walsh & Osipow, 1994, p. 238). This fact reveals the demanding nature of academic work in the field of E.C.E., a fact which hampers women’s participation in it since they have to deal simultaneously with the demands of both work and family (Ward, 2008). Nevertheless, the female F.M. in the field of E.C.E. are members of an intellectual elite and are obliged to pay the price of this choice with continuous and perhaps extreme effort. Their progress, relative to the progress of men may well to a large extent maintain the social ‘*structure of distances*’ as occurs in a handicap race (Bourdieu, 2007, p. 168-170).

The fact that more than half the females F.M.s in the field of E.C.E. in Greece attained postgraduate and doctoral titles abroad, as well as research and teaching experience at foreign universities, reveals that after the accumulation of the essential form of ‘pure’ scientific capital the way opens for some women to enter the male dominated field of E.C.E. (Bourdieu, 2005, p. 31-32). Additionaly, the entrance of a large number of women into the field of E.C.E. who either prepared a doctoral thesis in the same departments to which they were later appointed or had a previous working relationship in those departments, as academic associates or assistants, is pinpointed. In the latter case, it appears that together with the scientific capital which the specific women accumulated, they also shaped suitable ‘social capital’, which functions as a ‘resource’ and creates for them a positive network of social relationships which contributes to their integration into the academic field of E.C.E. (Bourdieu, 1994, p. 91-95). Under the above conditions, an important role was also played by the transitional clauses of Law 2268/1982 (Poulis, 2007), which introduced democratic entry criteria for the hierarchical grades of tertiary education and facilitated a significant number of scientists, and consequently women too, in their transition to F.M. in Greek Universities.

Although some women managed to get into the ‘male dominated’ field of the Departments of E.C.E., this happened at a relatively advanced age and since then there appears to be a slowing down of the progression of their academic career since the average length of time they spend at each grade is large (from 6.6 to 9.5 years). This phenomenon appears with strength in the international bibliography and is connected to a large number of other factors such as the women’s family commitments, the manner of their socialization which contributed to the formation of a gendered habitus which does not encourage them to lay claim to positions of power, the micro politics which treat women as unequal, the existence of a hidden gendered curriculum and their limited number of publications in contrast to their male colleagues (Anastasaki, 2007; Eliasson, Berggen & Bondestam, 2000). It would appear that these factors also operate within the field that we examine. To put it in another way, since a lot of the Greek female F.M. in the university field of E.C.E. are hesitant and do not dare to advance to the highest grade, the average length of time before they move up to the next grade for those who do decide to proceed approaches seven years. This is the highest permissible time limit a lecturer can choose before becoming eligible to move up a grade, because otherwise they are required to leave the university. What's more, this time period is more than double the minimum amount of time required at the grades of assistant and associate professor. Consequently, there appear perhaps to be some unseen obstacles in play which interrupt the upward progress of women in the university field. This is because it would seem that academic women *who* manage to enter the university as F.M. then face '*sticky ground…a glass ceiling and in between a very rocky path'* (Anastasaki, 2007; Toren, 2001). In addition to this, we should point out that according to Law 1268/1982 permanent tenure at the level of assistant professor is guaranteed, following the candidate's successful evaluation (Poulis, 2007). It is possible that this professional security reduces the demand for high hierarchical positions on the part of women and it reveals a cover up: '*The fact is that while to all intents and purposes there is equality everywhere, women occupy fewer privileged positions'* (Bourdieu, 2007, p. 169). What's more, the long waiting period at the grade of assistant professor reveals the difficulty and perhaps the indecisiveness of the particular female F.M. to aspire to reach the top of the university hierarchy.

Finally, from the opinions of the women, which are presented above in the sector of the "prejudices and the approach to women in relation to the female role" in the qualitative results, as far as their treatment in the particular field is concerned it becomes clear that under the pressure of the structure of the field, which is male-dominated, they occupy 'bad' in other words secondary and non privileged posts within it (Bourdieu, 2005, p. 34). There is in other words a 'negative symbolic factor' which is none other than their gender and which has a negative affect on the field of E.C.E. since it is connected with the more general gender based distribution of labour in western societies (Bourdieu, 2007, p. 171-172). In any case, as Maruani (1989, p. 15) eloquently observes: '*Work is always differently introduced according to whether it's carried out by men or women'*. That's also why the definition of a post with prestige within a field, like E.C.E., mainly connotes the male presence which to a great extent forms an obstacle to women taking it up (Bourdieu, 2007:123).

Conclusions

According to what we have examined above, we arrive at the following concluding remarks.

- Two significant factors, which favoured the entrance of a large number of women into the field of E.C.E. were: a) the attainment of postgraduate and doctoral titles abroad, as well as research and teaching experience at foreign universities. And b) the preparation of a doctoral thesis in the same departments to which they were later appointed, as well as a previous working relationship in those departments, as academic associates or assistants. Moreover, the entrance of the female F.M. in the Departments of E.C.E. in Greek Universities happened at a relatively advanced age and the progression of their academic career was a slowing down because of the average length of time they spend at each grade is large.
- In the field of E.C.E. in Greece, the social structural differences between the sexes still survive. This fact creates difficulties for the career progression and professional development of women, who also face difficulties in their work due to their commitments to the fulfillment of the demands of the role of mother. More specifically, the most significant difficulties which female F.M. in the field of E.C.E. in Greek Universities encounter are the dilemma motherhood and family or career, which is connected to the traditional role of women and the continuing existence to some extent in a lot of areas of Greece of patriarchal structures. Family commitments

seem to constitute a barrier to the assumption of administrative posts and the formation of the essential scientific capital (pure and administrative), which would secure the rapid academic progression of female F.M. in the Departments of E.C.E. It is a matter, in other words, of the existence of a disharmony between university posts and established dispositions (habitus) on the part of women, which does not aid their entrance into and rapid advancement within the field of E.C.E. A significant difficulty factor for female F.M. in the Departments of E.C.E. in Greek Universities is the prejudice concerning the female gender, which results in the unequal treatment of women in the particular field which is dominated at a local and international level from a "men – centered culture". It seems that women F.M. undergo the pressure of the structure of the particular academic field in the Departments of E.C.E. that is determined by the specific weight of scientific capital to whom are activated in the field (men and women).

To conclude, it seems that the field of Electrical and Computer Engineering in Greek universities is governed by a strongly gendered character and even today presents a picture of the gender based division of labour, without moderating it at all. In addition, it maintains the 'social structures of separation' between the two sexes, which influence the professional development and career of female F.M. within the particular field.

Note

With the enactment of Law 1268/1982 the mode of operation of the contemporary Greek university was formulated. More specifically, the following gradations of the teaching staff were established: lecturer, assistant professor, associate professor and professor. This law did away with the institution of the chair and shaped suitable democratic conditions for the appointment to posts on teaching staff of young scientists and women.

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THE INFLUENCE OF TEACHER SKILLS ON PUPIL VOLITION IN SCIENCE LEARNING: A NORWEGIAN INVESTIGATION OF THE STUDYING BEHAVIOURS OF 16-YEAR-OLDS

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Abstract

In a school system in which young people receive an ever greater degree of self-determination, it is important to study how the teacher can influence young people's motivation to work towards long-term goals in schoolwork. The purpose of this study is to investigate which teaching skills influence the volition of 16-year-olds. Structural equation modelling of cross-sectional surveys from one survey was used to estimate the path coefficients. The influence of teachers' skills on 16-year-olds' volition was estimated. The analysis indicates that the teacher's perceived ability to influence pupil volition is present, but modest. Classroom management has a moderately-high effect on pupil volition, whilst the teacher's press has only a moderate effect on pupil motivation. The teacher's relationship-building efforts have little effect on either pupil motivation or volition. The indirect effect from pupil motivation to pupil volition is of moderately-high strength. However, a cross-sectional study does not allow us to test causal relationships amongst personal antecedents of pupil volition. Teachers may exercise some influence over 16-year-olds' volition primarily by means of classroom management, but also in terms of pupil motivation via teacher press. Teachers may exploit this capacity to influence in order to improve pupil performance at school. For pupils lacking academic motivation, the teacher's efforts to motivate and to strengthen pupil volition are important, including in terms of social levelling. The study provides new knowledge about teacher influence on the volition of Norwegian 16-year-olds.

Key words: *adolescence, classroom management, motivation, Norway, teacher press, teacher's relational building, volition, youth*.

Introduction

At present the social-cognitive theory perspective has a strong position in the field of educational psychology, and the concept of self-regulated learning (SRL) is in vogue (Boekaerts, 1999). There is extensive literature on SRL. SRL theories are often viewed as a function of learning strategies, motivation, volition, and metacognition, bridging several strands of psychological research (Boekaerts & Corno, 2005; Wolters, 2003; Pintrich, 2000). "All theorists assume that students who self-regulate their learning are engaged actively and constructively in a process of meaning generation and that they adapt their thoughts, feelings, and actions as needed to affect their learning and motivation" (Boekaerts & Corno, 2005, p. 201). The basis of SRL theories is that it is valuable for the development of agency and ability that the student accomplishes setting personal goals for learning (hereafter termed goal-driven motivation) and pursues strategies in order to achieve these goals (hereafter termed volition).

Some researchers can understand the latter as implicit and almost a natural consequence of goal-driven motivation (Zimmerman, 2000). Other researchers isolate this as an independent factor which is referred to by several different labels: regulation of motivation (Wolters, 2003), self-discipline (Duckworth & Seligman, 2005) and volition (Corno, 2000).

Different kinds of psychological theories constitute their own niches. Each model emphasises slightly different aspects of motivation, volition, cognitive processing, et cetera. One of the niche-mileus distinguishes motivational processes from volitional processes (for instance Heckhausen, 1977; Corno, 2000; Kuhl, 1985), and volition is understood as beneficial constraints that pupils impose on themselves. This distinction is supported by experiments (Gollwitzer, 1999) and surveys (McCann & Turner, 2004, p. 1710). These and other researchers (e.g., Winne, 2004; Corno, 2004; Wolters, 2003) also address volition using a broad view of SRL theory. Research on volitional processes, however, is not tied to any one theoretical perspective, but can be viewed as consistent with several theoretical frameworks. In this article, volition is the endogenous variable of a theoretical approach which emphasises teacher skills as influencing factors. Discounting theory was used as a theoretical framework (Ainslie, 2001).

Traditionally, studies of volition have been closely connected to studies of motivation. Distinctions are often made between motivation and volition (Wolters, 2003). Motivation sometimes refers to an end state, but sometimes also to the means through which that state is determined, and more generally to management of the cognitive processes that govern learners' choice, effort, and persistence. Volition has been partly viewed as an aspect of motivation, whilst partly regarded as a distinct factor in the question of how pupil attitudes lead to action. Here, volition is the actual driving power for translating goal-directed motivation into action by taking self-discipline strategies into action. In this article, the focus is on the school context and in the school it is the teacher who is in the front line and who has the job of influencing pupil motivation and volition in a positive direction.

The Norwegian teacher is to use their personal skills to engage the pupils in the academic work and to produce the motivation to keep working at their learning (White paper, 2008). Therefore, it is interesting to study not only the connection between motivation and volition, but also different aspects of the teacher's performance of their role. This performance can be demonstrated in different tasks typically carried out by the teacher as part of their classroom work. On the one hand, the teacher is to be seen as a leader of the learning processes in the classroom. This has been held up as an important skill in Norwegian policy documents in recent years (White paper, 2008). This skill is referred to as *classroom management*.

The Norwegian authorities have placed an emphasis on exerting more "pressure to learn" as an important task for the teacher (White paper, 2003). *Teacher press* is thereby seen as an important skill in the execution of the teacher's role. Furthermore, the teacher's relational skills are of great significance in a Norwegian school context. In Norwegian schools, pupil satisfaction has been valued to a significant degree and pupils have been given some influence in respect to taking care of pupil satisfaction and well-being in the school (White paper, 2008). This skill is referred to as *relational building*. Relational building is an aspect of the teacher's role which presumably is not emphasised in the school culture of some other countries. One example is Japan, where the teacher generally has greater authority in the eyes of the pupils than is the case in a Norwegian school. In Japanese school culture it is not as important that the teacher creates a good relationship with the pupils. It is the Japanese teacher's authority conferred by their role that provides the teacher with a degree of influence over Japanese pupils' motivation, volition and thus actions (Stigler & Hiebert, 1999). As such, a distinct cultural feature of the Norwegian school system is highlighted: the ability to build good relationships with the pupils (known as relationship building) is an important skill for the teacher. These three distinct skills within the teacher's role are understood in this study as antecedents for pupil motivation and volition. The purpose of this study is to estimate the strength of these factors in relation to pupil motivation and volition for learning.

Research Focus

Given that Norwegian pupils in upper-secondary school have been given a significant degree of self-determination in respect to managing their own efforts in schoolwork, it is of even greater importance that they are able to take responsibility for their own studies. The theoretical perspective on which this is based is that the various options that the pupil has will be valued differently over the course of time. Pupils at upper-secondary school often set themselves long-term goals, for instance, in regards to choice of higher education. Other goals can apply to the medium and short term; in other words there is a continuum of goals and period perspectives. This is simplified by differentiating between long-term and short-term goals. Humans attribute values to these goals.

Discounting is a way of directly comparing present and future rewards (or punishments). Our decisions require us to weigh consequences that are distributed over time (Kirby & Herrnstein, 1995). Practically all human beings face 'choice-situations' in which they must choose between immediate and delayed rewards. When humans have choices, they can achieve at different points in time, the relative valuation of the choices is discounted according to expected delays until realisation. Learners who value schoolwork rather than non-academic activity in a lenient regime display consistent behaviour at any point in time. The school-oriented work is valued in a consistent manner over time, and it is valued more highly than non-academic activity. Such learners discount the option of a delayed reward according to an exponential curve, which implies stability of goals over time. Stability in preference structure over time presupposes exponential time discounting which is dynamically consistent: the relative motivational force of the two possible alternatives remains constant as one moves closer to them in time. These learners are self-regulated in their learning efforts.

Wolters (2003) considers self-regulated learners as having a large arsenal of cognitive strategies that they can readily and skilfully deploy to accomplish different academic tasks. These learners have a store of knowledge about cognitive learning strategies specifically, and they have the ability to select, monitor, and regulate their use of those strategies when engaged in academic tasks (Zimmerman, 1998). Learners may develop a range of volitional learning strategies to strengthen their resolve to stifle impulses and bolster good intentions related to their academic work. However, learners may have an acknowledged long-term objective for their education where constant hard work at school is necessary for them to achieve their goal, but they may lack volition for learning. They may deceive themselves in ways that support immediate gratification (high rates of discounting, Ainslie, 2001). Their behaviour is characterised by dynamic inconsistency. This is the modus operandi of weakness of will, and a model of hyperbolic discounting explains the qualitative properties of the classical weakness of will dilemma (Elster, 1979). The subjective value of a delayed reward is inversely related to the length of the postponement (Ainslie, 2001), a hyperbolic pattern that has been observed in extensive research on human decisions (Green & Myerson, 2004) since individuals have a tendency to attach more importance to rewards in the near future (myopia) than to rewards in the distant future. The preferences and beliefs learners have that are linked to goals may therefore be unstable in the sense that volitional processes influence the motivational impact of learners' goals.

There may be several models that explain dynamic inconsistency. One of the explanatory models is the model of hyperbolic discounting where the preference reversal is induced by the sheer passage of time. For disaffected learners there is often a motivational conflict between an immediate option that seems to loom too large and a long-term goal of getting through school.

Laboratory and field studies of time discounting find that discount rates are often much greater in the short run than in the long run, which reflects hyperbolic discount functions (Kirby & Herrnstein, 1995). The attractiveness of the reward increases when the reward can be obtained immediately.

If the learner is able to stifle the quick gain, this is volition. In the absence of strong volition for learning or paternalistic limitation of non-academic activity, realisation of alternative I will give higher utility than alternative II when the immediate reward is just round the corner. Volition entails "plans to sustain motivation and implement goals" (Corno, 2000, p. 659). For the learner, motivational conflicts may emerge between immediate options and a long-term goal, such as graduating from upper-secondary school. The volitional processes are therefore complex, and different metaphors are used to describe this complexity. One idea is that different selves take turns (Metcalfe & Mischel, 1999); the self is viewed as comprising several decision-making systems that may be in conflict with one another (Ainslie, 2001). The strategic interaction of successive motivational states within the person is explained by the bargaining as an ad hoc explanation of the struggle. The volitional processes according to the valuation of rewards and punishments here are seen as inner bargaining processes in which "any plan we make at one moment must be sold to ourselves at future moments" (Ainslie, 2005, p. 14).

Motivation, in this perspective, will have its basis in goals. A long-term and highly-valued goal might be being accepted for a specific course after the end of upper-secondary school education. In a short-term perspective, however, the immediate pleasures derived from personal actions may weigh more heavily than the long-term goals. In the absence of personal discipline to override short-term impulses, the choices made by pupils will reflect the interests of immediate satisfaction. Volition is the term given to the ability to override impulses in order to attain long-term educational goals. Volition is related to the individual's maturity. Both an individual's personality and their surroundings can affect their proclivity to override tempting impulses. The individual pupil's maturity is regarded as significant in relation to the ability for volition.

Within Norwegian schools 16-year-olds are responsible for making their own decisions, whilst their parents lack the right of access to the school's work plan in relation to their children. The teacher has even more influence over the pupil's motivation and volition. Research indicates that teachers can have relatively large significance for the learning outcomes of pupils.

In this study, the teacher's responsibilities are divided into "teacher press", the building of good relationships to the individual pupil (hereunder termed "relation building") and classroom management. Classroom management can take the form of clearly-expressed demands (warnings and encouragements) on how the pupil will behave in the classroom. For instance, the teacher can set clear boundaries for behaviour, give instructions requiring pupils to pick up school books, begin tasks, et cetera. This is seen as directive behaviour on the part of the teacher. The purpose of classroom management is to influence the pupil's beliefs regarding which alternatives they should focus on and which preferences they should have regarding their own study behaviour (goal-focused motivation). If the teacher succeeds in influencing the beliefs of the pupil, game theory uses the terminology of strategic moves and brinkmanship (Schelling, 1960). If the teacher wishes to influence the preferences of the pupil, game theory describes promises and threats. Classroom management is regarded as a more "hard-boiled" tool for influencing pupil behaviour in relation to specific situations in the classroom (the teacher can also demonstrate "gentle" behaviour). This can be viewed as important for ensuring peace and order and thereby for securing the conditions required for concentration and learning. As such, classroom management can be seen as influencing pupil volition.

Relation building involves creating bonds with the pupil that oblige the pupil to perform well to reciprocate the teacher's positive behaviour. Relation building occurs with reference to the social norms that apply to the interaction between teacher and pupil and can be significant for both the pupil's motivation and volition.

Teacher press occurs both through written work plans which the teacher sets up for a specified period of time, and also by means of verbal communication, which may be addressed collectively or individually. Press is used here to mean the pressure exerted by the teacher upon the pupil through the demands of work and expectations of performance in respect to the individual pupil. This pressure can be thought to influence both the pupil's motivation and volition. Those teaching skills mentioned here interact to strengthen or weaken each other. In other words, an interactive effect between the teacher's skills (classroom management, relation building, and press) and pupil's accommodations is present.

Methodology of Research

Sample and Implementation

With the Knowledge Promotion reform in Norway, there are 12 different study programs in the upper-secondary school curriculum plan. All the programs have a compulsory science course in the first year of upper-secondary school. Following Norwegian education authorities' focus on increasing students' interest in science, science was chosen as the focus subject in the survey. The subject is structured into primary areas, each of which contains embedded competence aims. Science has a number of competence aims after the second, fourth, seventh and tenth grades and after the first year of the academic and the vocational study programs offered in upper-secondary school. Students in the vocational programs receive parts of the academic program's science curriculum for the first year of upper-secondary school. However, the competence aims are the same within these areas. The main area of "the budding researcher" is compulsory for all students. Additionally, students study two main areas that the school designates as relevant to the study program.

The empirical study that forms the basis for the analyses was completed with seven upper-secondary schools located in the Norwegian capital, Oslo. The research study was implemented with the help of a research assistant who travelled around to the schools to administer an anonymous, paper-based questionnaire in the classes. In total, 48 science classes took part, coming from five of the twelve different study programs. A total of 1,112 students voluntarily participated. The survey response rate was high and close to 100%.

The intake point average among the seven schools chosen was 40.9. The intake point score is calculated as the sum of 11 marks after the 10th grade (scale from 1 to 6). This is somewhat higher than the average for all upper-secondary schools in Oslo (39.3). The intake point average among the seven schools varied between 37.5 and 44.2. Among the upper-secondary schools in Oslo there is a variation between about 29 and 48 points. In other words, the upper-secondary schools in the sample had from medium to high intake scores.

Instruments

Students answered a personally administered questionnaire with closed-ended questions on, among other aspects, motivation, volition, classroom management, teacher relation building, and teacher press. The focus was on academic aspects related to a specific school subject, in this case science, as previously stated.

The work is done within a classical test theoretical paradigm (Crocker & Algina, 1986) where psychological constructs are operationalized through a set of individual questions that are asked of the students. The students were asked to respond to questions that included the 5-point Likert-scale with alternative response choices: Strongly disagree (1), Disagree (2), Neither agree or disagree (3), Agree (4) and Strongly agree (5).

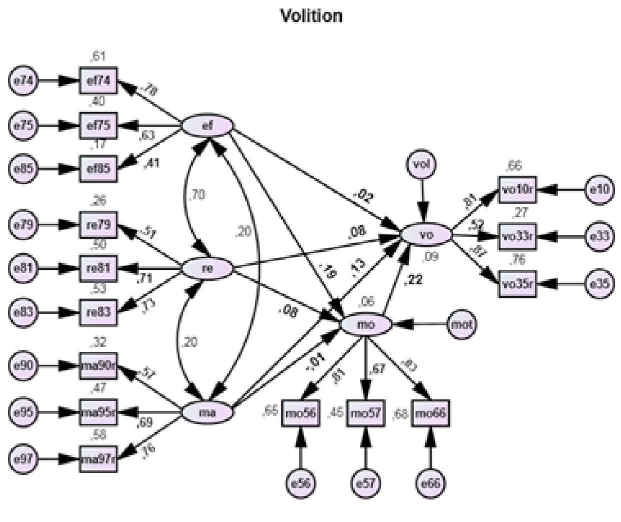
Constructs based on the questionnaire will be studied in the following; two constructs related to pupil's volition and motivation and three related to teacher's skills. Table 1 gives an overview of the constructs under study, with example items.

Table 1. Constructs with example items.

Constructs		Example item
Pupil's volition and motivation	Pupil volition	Mainly I do my homework at the last minute (reversed)
	Pupil motivation	It is important for me to learn as much as possible in science this school year
Teacher's skills	Teacher press	The science teacher makes high demands of us students.
	Teacher classroom management	There is disorder and disruption when we have science (reversed).
	Teacher relational building	It is OK to discuss feelings, worries and frustrations with the science teacher.

The analyses were conducted using SPSS 18 and AMOS 18. The sample size analysed consisted of 1,060 students after excluding students having missing values. To assess the measurement reliability of the indicators for each of the subscales Cronbach's alpha was used. Alpha coefficients of .70 or higher were considered to be acceptable (Nunnally & Bernstein, 1994). The Cronbach's alpha was below .70 for three subscales and above for three. The internal consistency is considered acceptable.

The assessments of both the measurement and the structural model are based on the p-value for the χ^2-statistic, RMSEA (root mean square error of approximation), NFI (Normed fit index), GFI (Goodness-of-fit index), and TLI (Tucker-Lewis index). The standard criteria $p > 0.05$, NFI, GFI and TLI > 0.95 and RMSEA < 0.05 have been used for good fit, and $p > 0.05$ and NFI, GFI and TLI > 0.90 and RMSEA < 0.10 for acceptable fit between the model and the data (Kline, 2005; Blunch, 2008). The fit indices (Figure 1) for the structural model are considered acceptable.



Standardized estimates
kji = 164,147; df = 80; p-kji = ,000; rmsea = ,032; nfi = ,961; gfi = ,980; tli = ,973

Figure 1: A structural model: Teacher classroom management (ma), teacher relational building (re), teacher press (ef), pupil motivation (mo), pupil volition (vo). N = 1,060.

Results of Research

The results in Figure 1 show that classroom management has a moderate direct effect (path coefficient = 0.13) on pupil volition, whilst the teacher's press has a moderately-powerful direct effect (path coefficient = 0.19) on pupil motivation. The teacher's relationship-building efforts have a rather low direct effect (path coefficient = 0.08) on both pupil motivation and volition. The direct effect from motivation to volition is moderately strong (path coefficient = 0.22). In general, these path coefficients have moderately low values. This means that teacher influence on pupil motivation and volition seems to exist, but the effects of the teaching skills studied here are not especially powerful. Some of the path coefficients have very low values, whilst others are moderately strong. In total, the model statistically explains nine per cent of the variance in the dependent variable volition.

Discussion

To the extent that the teacher is important for pupil volition, it is classroom management that seems to be the most meaningful tool for affecting pupil volition. The teacher's directive influence over the short-term options faced by the pupil can also help the pupil to cut off a behavioural impulse that occurs to satisfy a short-term need. As long as the pupil understands this and recognises the teacher's corrective work it is effective. In the Norwegian school culture, there are however limits for the kinds of tools that the teacher can employ as part of classroom management (White paper, 2008). If the teacher's intervention is perceived as unfair, for instance, a process can easily occur in which the pupils spend time and energy in opposition. This interpretation implies that effective classroom management is management that is perceived as straightforward and fair. The teacher's credibility as enforcer of rules and regulations is at stake over this. The elbow room available for the teacher is not great. For instance, in Norway it is prohibited to close the door on pupils arriving late to class. This issue has been raised at the highest levels in the Ministry of Education, and the Norwegian authorities have determined that the teacher cannot shut out pupils who arrive late (Dagsavisen, 2009). The weight of the teacher's personality, therefore, has even greater significance for whether or not the teacher will be able to influence pupil volition by means of classroom management. As an indication of the strength of the subjective perception factor amongst the pupils, measurements of how differently the same pupils judge the ability of different teachers in respect of classroom management are looked at.

The teacher's press appears to affect pupil motivation and to an insignificant degree pupil volition. This can be interpreted as suggesting that teacher pressure is perceived through the good vibrations in teacher-pupil interaction. When the teacher persuades the pupils that persistence in study is important, this occurs through motivation. Persuading pupils occurs through rhetorical practice. Rhetoric is the study of how teachers, for instance, perform convincingly in their communication with the pupils. In view of the significance of rhetorical skills in persuading pupils, it is astonishing that the study of rhetoric is entirely absent from Norwegian teacher education.

The relationship-building effect is slightly weaker than the classroom management effect in this study. On the other hand, the path coefficient between relationship building and teacher press is high at 0.70. This can be interpreted as meaning that relationship building and pressure to learn work together. However, the path coefficients between press and classroom management and between relationship building and classroom management are rather lower (0.20). The interpretation could be that classroom management is a more distinct skill than teacher press and relationship building. The teacher is faced with demanding tasks in the exercise of their role when the pupils are Norwegian 16-year-olds. The pupils have significant rights (for instance that it is the teacher who has the burden of evidence if the teacher lacks enough grades to set the teacher-attributed grade for the year) but the teacher has "a clearly-defined responsibility for what the pupils learn" (Stoltenberg, 2008). To some extent the visions of pupil influence and teacher accountability can be seen as conflicting goals. The teacher has to navigate in highly-demanding waters in which the culturally-distinct factors clearly direct what is and is not regarded as effective teacher behaviour. The margin of error in classroom management is not great, but can probably be increased if the teacher chooses to be consistent in his strategic deliberations concerning the type of rules and regulations that are to apply in the different classrooms (Emmer et al., 2006). If a teacher does this, it can avoid an unnecessary tug-of-war to determine what rules are to be applicable in respect to classroom behaviour (Evertson & Weinstein, 2006). Such a strategy will be more powerful if the school leadership also supports a common strategy for classroom management.

It is powerfully rooted in folk psychology that much self-determination is better than little. In the study of 16-year-old pupils' volition, it is not necessarily so evident that that much self-determination is better than little. Pupils can beneficially have some limitations on their behaviour to help them reach their long-term goals of achieving success in education. This study indicates that the teacher can make an impact especially by using classroom management as a tool, although the effect is not great. This can either mean that the potential for this tool is not great or that the teacher makes too little use of it. It is difficult to provide a concrete and definite answer to this. Here experimental studies which could isolate the significance of one aspect are needed. There is a fairly rich international corps of theoretical literature concerning the field of classroom management (for instance Emmer et al., 2006), but it is not certain that the conclusions drawn there are highly relevant in the context of Norwegian society. There is more than anecdotal evidence suggesting that there are clear cultural differences in the teacher's elbow room for the exercise of authority (Stigler & Hiebert, 1999).

It was not possible to investigate statistical associations between pupil motivation and volition on the one hand and pupil performance (measured, as "value added" through the course of an academic year). Norwegian law has established rules for anonymity in this type of survey and it is not possible to couple our data to information about grades achieved. On the other hand, other research shows a clear connection between pupil use of volitional strategies and performance (Duckworth & Seligman, 2005; Tangney et al., 2004). This makes us believe that volition forms an important category for the teacher in the work of influencing pupils' learning.

Strengths and Limitations

The strength of this study is that it has been carried out with a relatively large pool of respondents and that there has been negligible leakage in the carrying out of the empirical survey. Apart from those who were ill at the time of the survey, all pupils who were invited took part. This means that the statistical conclusion validity is relatively strong. The psychometric characteristics of the structural model also have good fit characteristics, which is also a substantial strength. In addition, the model is theory generated, which means that it is possible to regard the estimated path coefficients as reflecting some kind of causality (although researchers are not able to isolate the causality factors).

However, the contributions of this study should also be viewed in light of several limitations. Firstly, it should be emphasised that relatively little quantitative research has been carried out in relation to youth cultures in Norwegian schools. A cross-sectional study will only represent an instant image of a phenomenon. It is inherently true that statistical associations are not the same as causality. Motivation precedes volition and use of learning strategies. However, it can also be argued that effects from, for instance, teacher leadership towards learners operate in the opposite direction to that assumed in our hypothetical model. More research along the same lines will help understanding of the assumed causal relationships and of the mechanisms that are assumed to be responsible for the factors that have been measured.

The relations in the model estimated may not be linear. The optimal value of, for instance, classroom management may be lower than the optimal value of the scale. Furthermore, there is a need to include factors from outside the school system in order to study what kinds of factors influence the mobilizing of effort on the part of learners.

The empirical material covers seven schools in Oslo, Norway. The Oslo bias leaves some uncertainty about whether the selection is representative of 16-year-old Norwegian pupils. The material is not sufficiently comprehensive to study the differences between types of schools in a meaningful statistical analysis. Another possible improvement for future studies is to examine some cases in depth in order to attain a better understanding of the phenomena being studied.

There is a need to view the results of such surveys in tandem with new methodologies, for instance qualitative studies of teacher-learner interactions and parent-youth interactions that can address the complexities of the variable interactions. Studying the dynamics of student-student interactions is an interesting, but demanding, research approach. Controlled experiments are beyond the realms of possibility for educational researchers. Longitudinal and quasi-experimental studies of this sort are needed in order to come closer to inferences about causality.

A further limitation with this study is the use of self-reported questionnaire data. The subjective component of such data is undeniable. Independent judgments can provide interesting data about a learner's perceived conceptions and attitudes, but it is difficult to carry out this process whilst honouring promises of anonymity.

Implications for Practice

Despite its limitations, this study contributes to our understanding of how teachers may influence pupil motivation and volition among Norwegian 16-year-olds. If the associations between the independent and the dependent variables represent causal relationships, our findings may have implications for practice. Firstly, this study provides a moderate basis of evidence for claiming the presence of the teacher's perceived influence over volition, but to a surprisingly modest degree. Classroom management emerges as the most central tool for influencing volition. One practical implication of this is that teacher education, induction programs, and schools should place emphasis on suitable tools for classroom management and on the skills of students and established teachers in this respect. In addition, teacher press and relational building are tools that appear to have the capacity to affect pupil motivation. Here too, both teacher-education establishments and schools should be more aware of how student-teachers and established teachers can develop their skills in exercising pressure to learn in order to influence pupil motivation.

Conclusions

This study shows that teacher influence on pupil motivation and volition is surprisingly small when measured through path coefficients. However, two important nuances are important: the teacher can influence volition by means of classroom management and also by building positive teacher-student relations. In addition, there is a fairly clear empirical relationship between motivation and volition. The main conclusion has to be that teachers appear to have a moderate impact on pupil volition. This may be interpreted as meaning that 16-year-old pupils have a significant right to self-determination in the Norwegian school system.

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CONSTRUCTION AND APPLICATION OF INSTRUMENT FOR MEASUREMENT OF THE ATTITUDE TOWARD SCHOOL PSYCHOLOGISTS

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Abstract

This research has an aim to determine the status of the school psychologists in the primary schools in Republic of Macedonia, confirmed through the explorations of the attitude of the teachers and other expert personnel regarding the school psychologist. For the need of this research, an instrument for measurement of the attitude toward the school psychologist (SSP) is constructed. The main conclusions drawn from the field work, statistical evaluations and analysis are that a large percent of the subjects (73%) have negative attitude toward the school psychologists and there is a lack of basic information regarding their status, role and tasks. These results are very significant because it is more than necessary to reveal and maybe to change some essential requirements about the working tasks, the demands, the duties and engagements of the school psychologists.

Key words: *instrument for measurement of the attitude, school psychologist, working atmosphere.*

Introduction

The necessity of research in the sphere of human relations within the community is a permanent need. The relation, cooperation, the working atmosphere, friendship, mutual help, as well as the respect for the expertise, competence, the ability of adaptation and many other, are one of the many aspects of the problem so-called human relations. Their character in large extent will influence the attempts for successfully solving the ongoing and the foreseen working tasks.

In order to confirm the existing relations, as well as to determine the intended relations and attitudes, it would be the most adequate and most appropriate to deal with the relation “collective - school psychologist” at first. Taking into account that more than 30 years the school psychologists work at schools, it is understandable the interest to locate more closely their stand and the status which are built through the past 3 decades.

In that context, it is more than necessary to reveal and maybe to change some essential requirements about the working tasks, the demands, the duties and engagements of the school psychologists. Because, indeed it is very unusual and, ultimately, unjustified nowadays, after more than two decades a lot of communities to be pre-occupied by the issue of the need, function and the status of this expert staff.

Previous data about the investigated problem are very superficial and in large extent, very inadequate. The reasons are to be found in the uneven methodology and due to the fact that the members of the research team were focused rather to the status and role of the expert service in general or they were concentrated exclusively on the status and the role of the expert cooperator - the “school pedagogue”.

However, although little indicative, as a certain base over which this research is built, it is worthy to mention the works of: (Delchev & Adamchevska, 1986), (Murgoska, 1986) and (Georgieva, 1992).

Problem of Research

The problem of this study is the existing lack of knowledge regarding the status and the role of the school psychologists and, from there, the negative attitude towards them. This, however, derives by the fact that until now there is no similar instrument for measuring the attitude toward the school psychologists. Thus, the subject of the research is to determine the actual status of the school psychologists in the primary schools in Republic of Macedonia, confirmed through the examination of the *attitude of the teachers and other expert workers regarding the school psychologist*. Under the term “attitude” is comprehended: The permanent system of positive and negative evaluations, emotions and intention to undertake certain actions pro and con – regarding certain objects.

Methodology of Research

Besides the issues related to the three aspects of the attitude arising from the definition: “The attitudes are evaluative statements, either favorable or unfavorable towards objects, people and events and consist of three components: evaluative, cognitive and behavioral” (Greenberg, J. & Baron, A.R., 1997:49), the research is also oriented toward issues that reflect the existence of prejudice. Although they can be classified in the first group, given the awareness for the already built prejudices and resistance to the occupation, which deals with “lunatics”, that exist in the lay world, it is considered important to determine the percentage of their presence among professionals in the schools.

Thus, for the need of this research an instrument for measurement of the attitude toward the school psychologist (SSP) is constructed.

The instrument represents the classical scale comprising of 24 statements and four offered alternatives of choice (two positive and two negative). After the reading of the completing instruction, the respondent is asked to make his/her choice i.e. to appoint the degree of the own agreement - disagreement with the offered statement. The scoring is standard one, from 1 to 5 points, starting with 1 point for the alternative – “I completely agree”, at the negative statements, in fact opposite for the positive statements. If the respondent did not make any choice it is considered as an undetermined and will be granted 3 points. Thus, the range of the points of the scale is from 24 - 120.

In aim to provide bigger honesty, the instrument is anonymous. (Appendix 1)

By following the required steps and demands which are foreseen in such activity at first are determined several aspects of the “attitude toward the school psychologists”. It was taken into consideration the determination of the term “attitude” which is represented above. By that it is thought that the complexness of the attitude toward the school psychologist is comprehended regarding the: cognitive, affective (emotional) and connotative component.

The specified aspects are:

- Regarding the assessment of the status of the school psychologist;
- Regarding the assessment of the need of such personnel;
- Regarding the assessment of the own experience, knowledge, informing of what is this attitude about;

- Regarding the assessment of the readiness for cooperation;
- Statements which reflect the existence of prejudices.

From those specified aspects of the attitude, by using various sources and personal experience, 75 statements were formulated, after which were given to several psychologists, pedagogues and teachers for evaluation. From this valuation of the content of statements in the preliminary version of the scale 50 statements were incorporated. According to the propositions made by the author Bukvic (Bukvic, 1986: 97), when preparing a scale for measuring attitudes, the author(s) needs to begin with the phase in which they collect as many questions regarding the aspects of the attitude (preferably double of the envisaged final number of questions). The sources used in the formulation of the statements in the first phase are subjects who are familiar with the research problem: 15 staff psychologists, 7 unemployed psychologists, 10 teachers, 5 teachers and 2 university professors from the Institute of Psychology, Skopje).

The preliminary version of the instrument was introduced to 10 primary schools which have employed psychologists, and it was accomplished in 6 schools with total number of 70 respondents, with the following structure of school employees: 7 teachers from primary schools, 7 teachers from subject training education and one expert cooperator – pedagogue from each school.

After the receiving of each completed questionnaire the discriminative power was estimated of each of the 50 statements. A total of 31 statements whose t - value was between 3.57 –6.67, all significant at level 0.001 were chosen.

The integrated instrument was offered to another 7 primary schools with employed psychologists, and new 75 respondents answered the questionnaire. Once again the analysis of the discrimination power of each statement was undertaken, and after that, 24 statements were chosen which entered in the final version of the instrument. The calculated values of the t - test regarding the statements are from 5.79 – 13.21, all significant at level 0.01. This final version was offered to another 10 schools, while it was performed in 7 primary schools, and the total number of 96 respondents. In the following tables the resumed data about the sample of the research is given.

Table 1. Numerical presentation of the comprised subjects by schools in the three phases of the instrument construction.

Phases	I		II		III		Total:	
	Schools	Subjects	Schools	Subjects	Schools	Subjects	Schools	Subjects
Offered	10	150	12	180	10	150	32	480
Accepted	6	70	7	75	7	96	20	241
%	-4	46.67%	-5	41.67%	-3	64.00%	-12	50.21%

Table 2. Representation of the schools in which the instrument was offered and applied by municipalities.

Municipality	Schools in towns		Schools in villages		Phase		
	Offer	Entrance	Offer	Entrance	I	II	III
Bitola	6	6	2	2	*	*	*
Ohrid	2	1	/	/	*	*	
Resen	1	1	/	/		*	
Prilep	4	/	1	1	*	*	*
Kavadarci	1	1	/	/		*	
Negotino	1	1	/	/			*
Strumica	/	/	2	2		*	*
Berovo	1	1	/	/		*	
Radovish	1	/	/	/	*		
Skopje	5	/	1	1		*	*
Struga	1	/	/	/			*
Veles	1	1	1	1			*
Kumanovo	1	1	/	/			*
Total:	25	13	7	7	4	8	8

By the Roulon pattern the values of certainty was estimated, this value was $r_{xx} = 0.99$. Such high value was expected due to the type of the instrument and point out that the statements are homogeneous in the estimation of the attitude toward the school psychologist.

From the previously mentioned method it could be concluded that during the choice of the statements for the preliminary version a conclusion arise about the content validity of the scale.

After the application of such developed instrument, an in depth analysis of the results from the questionnaire was undertaken in which the stress was put on the following activities:

- A comparison of the scores of the respondents from each school separately;
- Determination of the representation of the claims regarding each of the five previously set aspects;
- A comparison of the representation of the statements among the three groups of respondents estimated by dividing of the scores on the quartile scale;
- A comparison of the average scores of the respondents regarding the criteria such as “location of the school” (a school in town – a school in rural community).

In order to process the data gathered, the criterion of t-test for analysis of significance of differences was applied.

Results of Research

Due to the specificity of the researched problem and regarding the individual presumptions during the research, can be concluded that the presentation of the collected data has been made very correctly, precisely and in a very selective manner. In the following text the collected data and the comparisons that are not involved in the personal domain and which present no individual information for the certain persons involved in this research are presented.

Table 3. Statistical parameters based on the results of groups of respondents from schools in town – village.

Statistical parameters	Schools in village	Schools in town
M SD Sx	103.81 19.45 1.97	88.04 25.05 2.10
	DM 15.77 Sdx 2.88 t 5.48	
	Significant on level 0.01	

The comparison of the average scores collected among the separate groups of examinees from town-village schools shows a certain statistical significant difference in favor of the groups of examinees who work in rural schools (t = 5.48). It is worth to mention that the distribution of scores around the arithmetic mean again is in favor of the group of respondents from the rural schools which shows greater homogeneity regarding the respondent's attitude.

Also, very indicative is the analysis of the scores of the group of respondents with the lowest achieved scores – to the first quartile. The analysis is made regarding the above mentioned five aspects of the attitude toward the school psychologist in order to determine the individual representations of the choices for each aspect. Such analysis contributes precisely to locate the reasons for the choice that has been made.

In addition, there is a table with the above mentioned representations of the choice of the five aspects.

Table 4. Percent presentation of the choice, separately regarding the aspect made by the respondents with lowest scores.

ASPECTS	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
The status of the psychologist	80	30	112	38	7	2	38	13	50	17
The need of psychologist	161	39	128	31	13	3	47	11	64	15
The deficiency of information	54	31	74	42	5	3	16	9	28	16
The readiness for cooperation	31	26	52	44	1	1	13	11	21	18
Prejudice	134	32	163	39	11	3	47	11	58	15

- 73% from the respondents whose attitude toward the school psychologist is negative has no enough information for the status, role and working assignments of the psychologist and about psychology at whole as a science;
- 70% from those respondents are disposed to cooperate with psychologist, but under the certain circumstances;
- 68% from those respondents did not concede the equal status of the school psychologist to that of the pedagogue;
- 71% of those respondents made their choice based over the preconceptions;

From the conducted research and its results, several questions and problems for future investigation arise, such as the following issues:

- To resolve the dilemma of whether it is about the existence of certain difficulties in communicating, or about still newly established communication channels and links;
- To affirm the necessity of establishing a separate strategy and policy for the treatment of specific issues of common interest, treatment of gifted and talented children, treatment of children with problems, treatment of children with special needs, by specifying the competencies, communication links and holders of information;
- The school psychologists must be actively directed towards some greater opening to the system (guidelines for individual access, newsletters, flyers, brochures, presentations, workshops);
- The mutual goals of the employees in the education system, especially from school psychologists;
- The passion of practicing the profession;
- The care for the own status;
- The vanity, and unreal expectations;
- The readiness for cooperation.

Discussion

All previous empirical researches related to the professional, pedagogical -psychological or developmental service in schools, had not a single central point of interest, i.e., they were widely posed and treated the problems regarding "the need, conditions, the development and perspectives of this service". Also, from the review of published literature in the professional journals and magazines, issued in the territories of the former state, whose part was the Republic of Macedonia, too, can be concluded that these developmental - structural problems of the profile "professional service - professional worker school psychologist", were uniquely treated for various reasons, among which the most important is related to the empowerment and development of the necessary professional personnel (associated with the opening of special high-school institutions that enable specific profiles of pedagogues and psychologists), but not only that, but also, because of the existence of different general orientations associated with the definition of the function, scope and general mission of these services. For example, "counseling", orientation of professional services in Slovenia, compared with, the "developmental – pedagogical", in the other states of the Federation, including the Republic of Macedonia (Trnavac, 1989, p. 97), with notice that, in that historical development, the professional service in Macedonia appears later and seems that gradually and quite difficult have positioned itself in the educational system, which actually show the data from several extensive empirical researches (Angelovski; Smilevski, 1986, p.7-9) and (Georgieva, 1992, p. 23-24).

It seems that the problems and the open issues are described in the aforementioned researches in our country do not differ at all, from those observed in the reports from similar studies of this problem realized in the neighboring countries that implemented this organizational innovation. Quite expectedly, in these countries it is actualized the interest and it is reviewed the situation regarding the normative - statutory, formal-legal issues of the positioning of the service, then the program - contents, and the issues related with the description and specification of jobs etc. In that past period emerge several individual research projects of fellow practitioners who pose a slightly different perspective turning the interest to the problems related with the dimension of the real self - analysis. Of course, here in particular should be emphasized the consideration about "the initiative of the professional workers" (Horvat, 1987, p. 37). Here, the problem of the initiative is related with the question of the "preparedness for active participation in the work and continuous training of the professional profiles", from which the pedagogical-psychological service is comprised.

Aware of the fact that all employees in these services are still only the first generation of such profiles, quite justifiably raises the concern and skepticism about the actual development of the profession. Namely, it is the clearer the fact that, if coupled with the other factors of the system, it is not provided a positive participation of this service in the educational process, then surely will emerge a lack of ideas, engagement or routine engagement in an ostensibly free time space within of work engagement, which slowly and imperceptibly begins to fill in with some other chores, mostly administrative, managerial, which ultimately will increase the risk of reducing the impact of these professional experts in the organization and will lead to gradual extinction of the profession. Indeed, already are known cases of the practice of not filling the vacant position "school psychologist" in the case of retirement, relocate to a new job, etc.

What is especially in the focus of interest is despite the above mentioned issues opened in the current researches is "the ignorance of the possibilities offered by the professional staff" and especially "the intensity of prejudice" associated with it and its work. This problem hereby called "concern about the own status and profession", certain researchers located as relevant to the situation back in 1986 and called it "a problem in the development of the pedagogical-psychological services arising from their own expert workers" (Angelovski, Smilevski, 1986, p. 2).

Having in mind the few recurring empirical researches related with the development, the situation and the perspectives of the pedagogical-psychological service in our state, organized and guided by relevant organized structures (National Institute for the improvement of education in Macedonia, 1986 and Inter-Municipal Institute for improvement of the preschool and primary education in Skopje, 1991), as well as, the several reports from individual researches (pedagogues), can be concluded that the detected difficulties, almost without change, appear in all of them. Besides the successful overcoming of the open issues related to the normative, statutory and legal regulation of the profile (the standards and working conditions of the pedagogical-psychological services), as well as, the issues of the contain determination of the specifics and the description of jobs, the sensitive issues in the area of the interpersonal relations and professional engagement (the collaboration, professional communication, trust, respect for expertise and competence, etc.) remained unchanged (Angelovski, Smilevski, 1986) and (Georgieva, 1992) (Petrovski, 1979).

What is also noted as constant and is confirmed in this research, and which indicates the "unwillingness for scientific and analytical approach to problem solving", is data that is received and commented back in 1986 and which states that: "the tasks from a purely analytical - research nature are under-represented among psychologists" (Angelovski, Smilevski, 1986, p. 13), on behalf of "the informational - instructive tasks that dominate and often come down to talk with students and parents". Why is this so? Probably not because of insufficient empowerment, but rather because of the demands and expectations of the environment that still has a distorted image of the profession and its specific orientation that is exhausted by the "advisory conversation" which is considered unjustified as unilateral act, not a prelude to long-term process counseling, which - as is provided somewhere (Mortensen, Schmuller, 1973, p. 173), other necessary conditions, knowledge, organizational climate, willingness for cooperation, etc.

The thing that is special and unique in this research is the goal set out: to concentrate on the analysis of already detected problem of "resistance and lack of cooperation" (Angelevski, Smilevski, 1986, p. 14 - 15 and Georgieva, 1992, p. 24-25), established in direct survey of professional workers - psychologists. In this case, that noticed resistance of which the psychologists are complaining, was analyzed from the opposite side of their associates in order to find out "why?", constructing the instrument for measuring of the attitudes, which in any case is superior to ordinary survey on which rested the previous mentioned studies. The initial idea of speaking in this way about "the attitude toward school psychologist" and given the opportunity for it to be specified by the several aspects embedded in the instrument, has shown to be entirely justified. It seems that for the first time in this study is correctly analyzed the issue of the resistance and approximately are determined the percentages of its occurrence.

One of the most relevant issues that were tackled in the theoretical analysis and which has full justification to be set and discussed is the issue about the “ownership of the problem”, which is mentioned by various authors (Smilevski et.al, 2007). It seems that in the education system in Macedonia are still insufficiently established the formal structures of communication links between its particular determinants, which in themselves would consist of certain details about the communication process, with formalized carriers of information. Namely, it is known that the quality performance of any human activity, profession presupposes theoretical knowledge, practical work experience, but also a formally determined particular area of activity. Such a functional coupling between the theoretical and practical seems to be most effectively accomplished through shared and accepted values on which should rest every organization, so the educational organizations, too. Of all organizational values, among some authors are rightly distinguished the MR-mutual respect; MT - mutual trust and OC - organizational commitment (Holistic model of HRM, Smilevski et.al. 2007), which should be seen as three main pillars, but as well as goals for responsible leadership that would streamline building the success and quality in their organization.

In this regard as the most appropriate organizational structure seems the one that separates the development - pedagogical functions from the educational tasks, management and administration (Korcmaros, 1989, p. 20).

The real picture of where the place is and what is the opinion about psychologists was an unjustifiably postponed need for a long time. In order to set the goal and the direction of further development it must certainly be known a starting position. The need for research in the area of the organizational communication, interpersonal relationships in schools is imperative. From what is the communication, will greatly depend on every effort to successfully address the current and future problems in the organization.

Conclusions

This study is an attempt to define the attitude toward the school psychologist through a valid instrument created for that purpose and to use those results as a base to set the future general directions for acting.

After the field work, statistical evaluations and analysis, as well as, after the interpretation of the results various conclusions derived.

The reasons and purposes for which the professional service was introduced in schools are related with professional-developmental, educational-pedagogical, pedagogical-psychological issues, with clearly defined areas of professional activity for which there are formal legal documents (confirmed by the researches), but it is likely that there is proper practice and their real revival. (71% of the respondents would not cooperate with the school psychologist).

There is a certain resistance existing toward the implementation of such researches, indispose for cooperation and huge dispersal of the examinees involved in this research. The motives of such occurrences can be only assumed.

It can be noticed that a certain percent of the subjects (30-35%) with negative attitude toward the school psychologist which is not built over the prejudice - a fact which is worth to draw the public attention.

Also, there is a lack of basic information regarding the status, role, tasks, importance and possibilities offered by psychology as a science. But, also, there is certain mistrust in the justifiability of practicing the science method in solving the problems that we are faced with, even coming from the colleagues psychologists. Their most frequent annotations are: it is very risky, the scale is too long, the statements are not suitable, self-negation acting which, of course, do not correspond to reality and do not take into consideration the technology of performance of this type of measure instrument which itself implicate a certain conclusion.

This kind of researches, in large extent, are risky and by a certain part they penetrate into the very sensitive area of the personality where we inevitable face with someone's "self concept", someone's "image of his/her own". That is why the authors restrained from enunciating of more detailed and complete information and comparison of collected data. It can be supposed that here lies the reason of the above mentioned resistance and indisposing for cooperation.

The future work of each school psychologist, as it was till nowadays and in each profession, which create its own criteria, should be in accordance with his/her personal convictions, knowledge, possibilities and needs. While on the own manner he/she could manifest own individuality, initiatives, capability thus adapting to the reality which may not be suitable, for what we are guilty in large extent, because it is obvious that the critical edge is not reached yet in which the greater number of psychologist would have need and desire of set and solve the mutual problems.

The respondents from town schools had lower average scores on the SSP comparing to those from rural schools. It means that the attitude of the respondents from the town schools is more negative from the employees from the rural schools who has better positive attitude toward the school psychologist. It does not automatically mean a greater and more liberal field for work and acting, but rather it is a result of influence of many other factors. Also, it is important to mention that regarding the readiness for cooperation, the psychologists coming from rural schools are more alert for cooperation. One of the factors for such condition maybe is the less engagement regarding the number of pupils and teachers, number of news and projects which is distinctive for the schools in rural communities. But, of course it is worth to mention some other factors which were not taken into consideration in this research because it could disturb the anonymity and thus, the honesty of the respondents during the answering of the questionnaire.

The result of the research is an instrument which is not perfect, especially regarding the discriminative character due to the large number of statements. The imperfection means challenge for further work by many other colleagues.

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Appendix 1. Instrument for measurement of the attitude toward the school psychologist (SSP).

In addition you will find a certain number of statements which represent opinions to what you will agree or disagree. Beside each statement four (X) signs are offered which express different degrees of agreement or disagreement. You are asked to mark the degree of your agreement or disagreement with each statement, by marking only one (X) which expresses your choice. Read carefully each statement but, do not lose too much time on thinking. Answer each claim. There are no “correct” or “incorrect” answers. All answers express your personal opinion and are considered to be correct. Your answers will be utilized only in science purposes and that is why they are anonymous. Answer as you really feel like.

	STATEMENTS	Totally agree	Partially agree	Partially disagree	Totally disagree
1	The role of psychologists in schools is negligible				
2	The cooperation with psychologist is related with the noticed his/her contribution				
3	If there was a need of psychologist every school would employee such personnel				
4	Ii is clear what school psychologist should work				
5	Psychologist only know how to perform testing				
6	At school all are satisfied with the work of psychologist				
7	Psychologist should be reconciled with the fact that they are no needed in schools				
8	Although they are employed in schools they are only needed in health care system				
9	Howsoever they want be equal to pedagogues they will never accomplish that				
10	The cooperation with psychologist derives only from curiosity				
11	When psychologist interferes in teachers work it become complicated with no effect				
12	Always newly suggested innovations coming from psychologist should be taken with reserve				
13	The nature of training-education process did not allows equality between pedagogue and psychologist				
14	Only one psychologist is enough for all schools in the municipality				
15.	The pedagogue has a great support from teachers because his work is more valuable for improvement of training-education process				
16	Schools will loose nothing if they give freedom to psychologists to participate equally in planning and organizing of the training-education process				
17	The duty of the expert service of school is not performed entirely with out psychologists				
18	The funds spent on psychologists work could be utilized more reasonable				
19	It would be better to rather vote for teacher than for psychologist to perform leader position, regardless the qualities of both				
20	The modern school is consist of more computers rather than more psychologist at service				
21	If the psychologist have a leading word in the service it would be bad for the general atmosphere in the school				
22	School psychologist should be satisfied by having job at whole				
23	Due to many mutual relations with training-education process, psychology has a great contribution in the discoveries important for its modernization				
24	This test is also only one useless psychology hassle				

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ADAPTATION ANALYSIS OF SOME ALTERNATIVE COMPETENCE-BASED EDUCATION PROGRAMS' IN A HUNGARIAN PUBLIC SCHOOL

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Abstract

Some international researches has proven that Hungarian students are below the desired level regarding the application of acquired knowledge in many areas. In recent years competence based education includes knowledge, attitudes and abilities, gained ground in Hungarian schools. Our research aims to analyze the sustainability of some competence based, alternative education programs in Hungarian public education. Additional objectives include: revealing the opinion, examining the impact, exploring the related experience of students, parents, and teachers towards the following competence-based education programs: „Student Cognition" „Lesson Differentiation", „Project Based Education", „Epochal Education", „Cooperative Education" and „ICT tools". Questionnaire was used as a research method, applying SPSS to evaluate our data. The survey was carried out in a public school which takes part in the dissemination of competence based trainings. Sample consists of 158 participants. Results: applying these practices students and teachers are more effective to discuss their problems, the quality of education improves. Meet the students' age characteristics, establish better measurement and evaluation system, clearer rules. Adapt to the students' abilities/skills increasing their self-sufficiency and performance orientation. Consequently, the new practices can be appropriate to meet the challanges of public education in the 21st century.

Key words: *Hungarian students, Hungarian public education, competence-based education programs.*

Introduction

The Hungarian educational experts reacted quickly to the international educational-pedagogical trends already in the start-up phase of education reform concepts. The reform pedagogical trends appearing at the turn of the 20th century met with success and gained followers not just abroad but in Hungary as well. In 1908 opened up the so-called „Open-air forest school" modelling the „Landerziehungsheim" school in Germany (Németh, 1993). In Italy it is worth mentioning the first kindergarten which applied the Maria Montessori's pedagogical methods based on her physiological-psychological results. In the spread of this pedagogy in Hungary Erzsébet Burchard-Bélavári had the major role who set up her „Montessori kindergarten" in 1927, and one year later her „Montessori school" in Budapest as well. In this period not only foreign, but Hungarian reform pedagogical aspirations turned up.

These aims were to spread the modern educational-psychological principles and to create new basis for education. Some outstanding educationists and pedagogues of the period: László Nagy, Weszely Domonkos (Pukánszky&Németh, 1996). Furthermore, Márta Müller Nemes established the so-called „Family-school" which is inspired by Ovide Decroly, who set up his theoritically well-founded school in Brussels in 1912. Some of the concepts described in the second period of reform pedagogy also appeared in Hungary soon. The theory of Waldorf-pedagogy was born in 1913, then in Stuttgart in 1919 appeared the first „Free Waldorf-school" operating in a spirit of antroposophy. In Hungary Mária Göllner the student of Rudolf Steiner established the first Waldorf school. Before the World War II the centralized education policy then the war itself led to the end of alternative schools. In 1945 a governmental decree warranted the establishment of regular eight grade elementary school and the resulting monolithic public education system had little tolerance for alternative forms of education (Pukánszky&Németh, 1996).

From the seventies the alternative schools could be established again in Hungary. Important experiments took place in Szentlőrinc in 1969 by László Gáspár and the elaboration of the „Permanent education theory" by József Bernáth, Ottó Mihály and János Páldy in 1970 should be mentioned as well. One of the most-influenced programs was created by József Zsolnai called „Value mediation and ability development". It was first applied in Törökbálint Practice School in 1985 (Pukánszky&Németh, 1996, Torgyik, 2004).

As of the 1990's the new laws made the establishment of alternative schools possible. From that time lots of schools adopted one of the reform pedagogical concepts as their educational program or created their own alternative pedagogical program. Later the Freinet-pedagogy, Dalton-project, Jena-project and Rogers' client-centered therapy also appeared in Hungary. But the initial enthusiasm has not been followed by the spread of these schools, only the schools of „Value mediation and ability development program" (Kiss, 2002) and the Waldorf-schools (Vekerdy, 1994) are considered widespread in Hungary. The other concepts and approaches mentioned sparsely appear in public schools and the alternative schools have not established a network in public education, instead they remained isolated (Langer, 2010).

Problem of Research

As an antecedent to the research program described by the present essay between 2001 and 2003 we assessed the problems of public schools at the beginning of the 21st century. The inquiry pointed out these conditions, which public schools in disadvantaged areas were forced to cope with:

- Education accumulates knowledge, relies on memory.
- Students are regarded as receptive, frontal education is dominant.
- The amount of stored knowledge is central aspect of evaluation.
- School books do not promote independent learning, their primary goal is conveying information and knowledge.
- The aim of evaluation is the control of knowledge acquisition.
- Maintenance of discipline is an important goal.
- Teachers use rewards and punishments to retain student interest, whose motivation is mostly extrinsic.
- The applied methods do not support the cooperation and mutual assistance among students
- Short lessons (45 minutes) are not suitable to apply the project-based and „natural learning" method.
- „Personalized treatment" and „personalized development" are rarely used methods

- ICT tools are used for playing, not for active self-studying.

After exploring the problem Hungarian researchers worked out methodological recommendations and programs (for instance „Alma-mater project") between 2003 and 2004 (Szebeni, 2004, Hanák, 2009). Then this research group joined in 2 national methodological development projects, in which more competence-based programs were elaborated (2005-2011) utilizing the previous results and incorporating the already developed methodological approaches. The international overview of teacher career eligibility competences and standards has also been carried out (Falus, 2011). After accrediting the programs these alternative practices were introduced in several schools, for instance in the examined school as well.

Research Focus

The present research aims to analyze the suitability of some competence-based training programs in the Hungarian public education. The study carried out among school teachers in Western Hungary confirmed that lots of teachers reported anomalies about methodology, organization, teaching tools and forming student communities (Németh, 2009).

The research effort aims to reveal the opinion of students, teachers and parents about the effectiveness of the programs based on alternative pedagogies in public school situated in a disadvantaged region. The examined school applied the following competence-based education programs:

„Getting to know students": Help teachers gain important information about the students' personality, learning abilities and to recognize learning disabilities as disgraphia. Apply the facilities of students' personality development (Tóth, 2005).

„Lesson Differentiation": Make teachers apply processes and practices by which the students' personalized development can be achieved and their personalized cognitive needs are satisfied (Kopp& Ollé&Zágon, 2006).

„Project Based Education": It is appropriate for students to learn how to learn efficiently. It is a target-centered teaching strategy which helps to obtain goals by applying attivity-centered, task-oriented technics. Broadening the schools'frames the aims are achieved in natural learning environment (Estefan-Varga& Szikszay, 2006).

„Epochal Education": The coherent materials and literacy areas are blocked and organized into one period, instead of 45 minutes lessons in all weeks of the semester (Ballér, 2002).

„**Cooperative Education**: It is based on the cooperation of the participants, who work together in small groups. It develops efficiently the self-esteem and problem-solving of students. Paralel interactions and equal participation are basic principles (Kagan, 2004, Taskó, 2011).

„ICT tools": Help spreading the applicable methods for developing digital competency. It is important for the teachers to know the latest ICT innovations and the possibilities of using these tools (Lengyel, 2011).

Methodology of Research

General Background of Research

Our research centre has been a long-term cooperation with the school in which the study was performed. When we started to unfold the problems of public education in 2001, we already found this school as an interesting field to study, because this school are located in Hungary's most underdeveloped region, it applies competence-based teaching strategies to compensate the worse situation of underprivileged students creating the possibility to emerge. The former projects mentioned above have already been developed in this school (ex. Alma-mater Project). As a first step of our present research we selected the competence-based education programs worth adapting in this public school. This work has been in cooperation with the teachers of this school. Then the teachers fulfilled in-service teacher training programs, where we prepared them to apply these programs in practice. In line with it programs' adaptations were performed. Then in the classes participated in the study the education started applying the new competence-based education programs. As 1 year has passed since the adaptation of these programs, we decided to study the effectiveness of this work by measuring the opinion of students, teachers and parents.

The study was carried out at a public school which contains both elementary and secondary sections. The host institution is also an active participant in the dissemination of the results of competence-based education programs. The school assigns high priority to „Getting to know students", „Lesson differentiation", „Personalized ability development". Projects and epochas are periodically used. ICT tools are usually applied during education.

Sample of Research

67 students, 24 teachers and 67 parents (158 participants) took part in the study all of them are concerned in the competence-based education programs. The student sample is based on two full classes whose members learn under the competence-based education programs. They were 1st and 7th grader primary school students. 33 1st grader and 34 7th grader students participated. This sample was completed with one parent from all students (67 altogether) and 24 teachers who teach with competence-based programs. We regard the sample as little, but it would have been impossible to adapt all materials' curriculums from traditional to competence-based, so only two classes were available. If the participants of these programs are proven to be satisfied and feedbacks are favourable in this study, we consider adapting the other grades' curriculums as well. Furthermore, each teacher had to adapt their all-year curriculum for the new requirements, which was a long and heavy work.

Instrument and Procedures

3 questionnaires were developed by our research group. These questionnaires contain the same factors aiming to unfold the students', parents' and teachers' opinion of the new competence-based programs. Practically all questionnaires contains the same questions, there were only stylistical differences among the 3 questionnaires to address the 3 target groups. Each questionnaire contains 18 items, in which there are questions about quality evaluations, satisfaction with the new programs, student-teacher relationship, clarity of rules, the achievability of requirements, effect on talents, teacher-student problem-solving, extracurricular activities etc. The participants answered on a five grade Likert-scale and replied to some open questions as well. 3 open questions also have been in the questionnaire which aimed to unfold what other important thoughts emerged in the students, teachers and parents in connection with this subject. Items: „What did you like the best in this year?", „"What would you change on?", „What programs would you like to meet in the future?"

Data Analysis

The statistical analysis was performed using SPSS statistical program. Descriptive statistics (mean: $\bar{x}$; standard deviation: SD) were used to measure the satisfaction data. With independent samples t-test we assessed whether the means of two genders are statistically different from each other. Pearson Correlation (r), the most commonly used bivariate correlation technique, measured the association between our quantitative variables. The reliability of each questionnaire was measured by Cronbach-alpha coefficient (α), which showed the consistency of measures.

Results of Research

Based upon the respective answers the 3 groups' means were calculated (Figure 1).

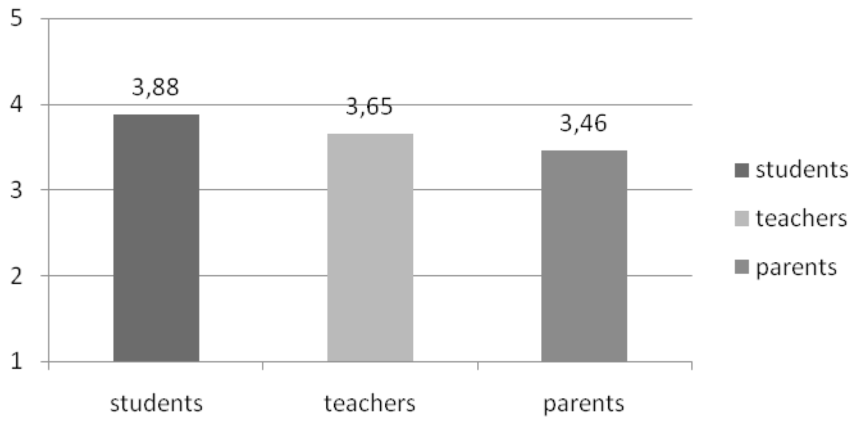

Figure 1: Means of 3 groups (n=158).

The reliability of the questionnaires were relatively high as it is seen in Table 1 below.

Table 1. Reliability analysis of the questionnaires (n=3).

Questionnaires	Cronbach-α
Teachers scale	0.851
Students scale	0.887
Parents scale	0.944

The students consider the new programs most effective ($\bar{x}\bar{x}$=3,88, SD=0,97), following the teachers ($\bar{x}\bar{x}$=3,65, SD=0.69), lastly the parents ($\bar{x}\bar{x}$=3,46, SD=1.05). In details it is shown in Table 2 below.

Table 2. Comparison of Means for all 18 items in 3 groups (n=158).

Examined issues	Students' opinion		Teachers'opinion		Parents' opinion	
	Mean	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*
General satisfaction	4,18	0.80	3,83	0.56	3,73	0.88
Development of personal skills	4,45	0.67	3,71	0.55	3,64	0.85
Quality of education	4,05	0.67	4,25	0.61	3,77	0.61
Clearity of rules	4,09	1.06	3,83	0.96	4,14	0.94
Achievability of requirements	4,14	0.83	3,79	0.66	4,14	0.57
Reply to learning difficulties	3,52	1.29	3,54	0.72	3,19	1.12
Development of talents	3,82	1.01	3,79	0.78	3,29	1.15
Measurement and evaluation system	4,00	0.75	3,92	0.58	3,60	0.82
Helping career choice	3,76	0.89	3,78	0.67	3,63	1.16
Communication	4,19	0.98	4,42	0.58	4,14	1.28
Cooperation among students	3,62	1.07	4,46	0.51	3,68	1.17
Community development	3,41	1.14	3,67	0.76	3,14	1.17
Effect on extracurricular activities	4,16	1.12	3,86	0.89	3,00	1.12
Effect on free time	4,06	1.03	3,64	0.66	3,22	1.11
Autonomy	3,53	1.17	3,55	0.74	2,90	1.04
Achievement orientation	3,50	1.10	3,67	0.92	3,17	1.20
Matching age characteristics	4,38	0.74	4,18	0.73	3,19	1.38
Student-teacher relationship	3,15	1.27	3,74	0.62	2,89	1.41

Students are satisfied with these new methods ($\bar{x}\bar{x}$=4,18, SD=0.8), they believe these develop their abilities better ($\bar{x}\bar{x}$=4,45, SD=0.67), match their age and useful for their leisure activities ($\bar{x}\bar{x}$=4,38, SD=0.74). By these programs it is easier to discuss their problems with the teachers ($\bar{x}\bar{x}$=4,19, SD=0.98), and the curricular requirements are easier to fulfil, the rules become clearer ($\bar{x}\bar{x}$=4,14, SD=0.83).

Studying the correlations it is found that the boys are significantly more satisfied with the new programs' effect on the development of their abilities (t=2,73, df=66, p=0.013), also the age of students correlates with the evaluation of new programs (r=0,484, p=0,026). The upper school students (7th graders) evaluate them significantly better than lower school students (1st graders). The reason for that the upper school students is likely to have spent more time under traditional learning programs so it is easier for them to compare the traditional and alternative programs.

Teachers emphasize that by means of new programs it is easier to discuss the students' learning and other problems ($\bar{x}\bar{x}$=4,42, SD=0.58), the quality of education improves ($\bar{x}\bar{x}$=4,25, SD=0.61) and it matches to the students' age characteristics ($\bar{x}\bar{x}$=4,18, SD=0.73). These programs' measurement and evaluation system are regarded as optimal, the rules become clearer ($\bar{x}\bar{x}$=3,92, SD=0.58). The requirements are easier to achieve, help the talented students develop ($\bar{x}\bar{x}$=3,79, SD=0.78). Furthermore the new programs help students in their carrier choice ($\bar{x}\bar{x}$=3,78, SD=0.67). It is easier to adapt to the students'abilities, help efficiently who have learning difficulties ($\bar{x}\bar{x}$=3,79, SD=0.72). They regard students'separateness and motivation in lessons as positive $(\bar{x}(\bar{x}$=3,55, SD=0.74).

A tendencial significant correlation can be discerned between the teachers'gender and the possibility of discussing students'problems (r=0.397, p=0.06), and also between gender and satisfaction with new programs (r=0.398, p=0.06). Female teachers' evaluation is better (t=-1,968, df=23, p=0.06), but since there are less men in the sample, the respective results should be treated with caution.

Parents are less satisfied than students and teachers. They do not experience positive change in the time spent with learning by their children ($\bar{x}\bar{x}$=2,90, SD=1.28). However, they regard the new programs as more efficient in clearing the requirements and expectations ($\bar{x}\bar{x}$=4,14, SD=0.94) and in discussing problems ($\bar{x}\bar{x}$=4,14, SD=1.28).

Qualification of parents correlate with perceived quality of education (r=0.426, p=0.048), with clarity of rules (r=0.443, p=0.039), with possibility for their children to discuss problems with teachers (r=0.514, p=0.014), and with student-teacher partnership (r=0.452, p=0.035). There is correlation between the parents' gender and student-teacher partnership (r=0.452, p=0.035), mothers have a tendencial significantly better opinion about it (t=-1,968, df=66, p=0.066). The gender correlates with how the new methods support their children'career choice (r=0.395, p=0.094), the fathers evaluate it tendencial significantly higher than mothers (t=1,775, df=66, p=0.094). Parents are satisfied as the new programs are compatible with their children's age characteristics and support their extracurricular activities (r=0.514, p=0.042).

Analyzing the *open questions* it is stated that *students* would like to have more ICT lessons, they are pleased with the new programs and do not want their teachers to return to the „old approaches". In addition they need more free time, trips, movement. *Teachers* direct attention to the need for reducing class size, the irregularity of ICT accessibility (require much time to pack and unload) and the demand for greater Internet accessibility. It should be useful to amend teacher-parents communication, the cooperation among teachers, they would like greater freedom in teaching and less administration. *Parents* are afraid that the second language is not given equal importance. They believe the classrooms'equipment should be developed. They would like to know more about the new programs. More oral presentations are required. Greater effect on education and more emphasis on discipline are needed. On the whole they are satisfied with teachers' pedagogical and organizational work.

Discussion

As it was mentioned in the introduction, the Hungarian scholars of education reacted promptly to the international educational-pedagogical trends already in the first phase of reform pedagogical conceptions. In the 21st century the Hungarian education policy has become more open to new ideas and concepts and promoted their widespread application in public education. The education experts drew up the key competences which are necessary for every European citizen to acquire to unfold their personal abilities, to participate in social life and to be employed. Its realization is not so easy with as many problems as it is demonstrated in the problem revealing part of this study. In Hungary -as we mentioned- more competence-based education programs have been elaborated, public schools have the right to adapt them or not. According to a representative national study (n=1755) 44.5% of the pedagogues regard competence-based programs as useful, contrarily in our disadvantaged region this number is only 40.7% (Liskó-Fehérvári, 2008). This number indicates us that more attention is needed for each school in our region. An other national survey found out what kind of in-service teacher training programs are willingly chosen by teachers (n=2569). The results of this survey correspond with our present study: 73% of teachers chose „Lesson differentiation", 72% of them „Cooperative techniques", followed by Projects and epochas (66%), „Getting to know students" (66%) and ICT (65%). (Liskó-Fehérvári-Havas-Tomasz, 2007). In our host school all of these programs have been elaborated and applied. Furthermore, in a new study we can read about the applicability of these competence-based programs evaluated by teachers. The national sample (n=1993) showed 3,4 mean score in 5 grade scale (Liskó-Fehérvári, 2008) in constrast with our study in which 3,65 mean score is shown by teachers. It signs that in our disadvantaged region „development in small steps process" seems to be efficient. Measuring of parents' and students' opinion has not been publicated in Hungary yet, however, we consider all 3 groups' evaluation important, because these programs are viable only if every concerned person value them as desirable. The future studies have to measure this aspect alike. We emphasize that the developed and incorporated alternative programs in public education still have to be sustained.

Conclusions

The research sample is not so high so the results have to be considered with limitations and these conclusions cannot be generalized to the whole population, but the tendencies are clearly seen: the results reveal that new competence-based programs meet the needs all of different actors of the educational-pedagogical scene. The results of present study complete the studies publicated in this topic so far by taking attention of the schools of underdeveloped regions which need enhanced professional support, furthermore shows the importance of considering the common evaluation of students, parents and teachers. Teachers are willing to apply them, however they notice the problems alike, for instance the oversized class numbers and also deficiencies like the teamwork among teachers and communication between teachers and parents. Students enjoy learning with these programs. These programs develops the students' interpersonal skills and abilities, which are underemphasized in the current education system. These programs help to develop their knowledge, abilities and attitudes which contribute to form key competences expected by European Union. Parents emphasize the positive and negative sides of these programs as well. They feel that it develops the relationship and problem-solving discussions between teachers and students. However they do not know these programs enough that is why a little doubtfulness occurs related to discipline and second language.

However, the initial difficulties of introducting these programs demand much work, need for cooperation and patience by the actors of the Hungarian public education. In the future our research group aims to concentrate on resolving of questions, fears and doubts emerged in the participants related to these programs.

All of these statements indicate that these alternative programs are successful and popular in public education, it would be useful to broaden their availability and should play more important role in teacher training.

As competence-based education programs have indirect effect on development of key competences accepted by European Union we hope that the presentation of our study and obtained results are useful for international arena and we are waiting for the feedbacks of our colleagues.

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CURRICULUM DEVELOPMENT FOR E-LEARNING: A CONCEPTUAL FRAMEWORK

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Abstract

The aim of this paper is to develop a conceptual framework for curriculum for e-learning. The conducted research is based on two dialectically intertwined pillars. The theoretical pillar consists of the rich critical tradition of inquiry into the relationships between technologies and human beings in wide social contexts from Frankfurt School onwards. The practical pillar consists of Dahlberg's main strands of Internet research – Uses Determination, Technological Determination and Social Determination (2004). Blending the theoretical and the practical pillar, it is shown that the discipline of e-learning consists of Habermas's three main spheres of human interests, types of knowledge and research methods – the technical, the practical, and the emancipatory (Tinning, 1992). The conducted research does not include explorations of epistemological basis for combining various theoretical frameworks and research methodologies. For this reason, its results cannot be applied to scientific research without further elaboration. In order to expose students and practitioners to the true structure of the discipline of e-learning, however, results of this research can be confidently applied in practical fields from curriculum development to policy making.

Key words: *critical e-learning, e-learning curriculum development, spheres of human interest, e-learning research strands.*

Introduction

During the past few decades, education supported by computers and the Internet commonly known as e-learning has been rapidly growing in scope, size and complexity. This growth is dialectically intertwined with the increasing demand for specialised labour, which has been met by introducing appropriate modules and degrees in worldwide higher education institutions (Anderson & Elloumi, 2004; Jandric & Boras, 2012; Pal & Ganguly; 2010). However, e-learning is significantly different from traditional education (Anderson & Elloumi, 2004; Bates & Sangra, 2011). This leads to the obvious question: what should we teach future e-learning practitioners?

In order to answer this question, one should first examine what is being taught at the moment and analyse some of the consequences of the current approaches. Based on Foucauldian discourse analyses, Fejes and Nicoll assert that "discourses of e-learning have tended largely to construct the area of study as about the mechanics of its implementation (the appropriate use of technology in education, the effective delivery of educational messages, the efficient systems for materials production and so on)", and show that such approach leads to the wide spectrum of problems (2008: 174). Looking more closely at technology, Teo and Gay assert that e-learning resources predominantly consist of the advanced repositories of documents, and propose a knowledge-driven model to personalise e-learning (2006).

In their analysis of introduction of e-learning into educational institutions, Bates & Sangra show that "technology projects were not successful in bringing about sustainable elearning", and propose approaches driven by pedagogy and management (2011). Looking from a pedagogical perspective, Laurillard shows that "despite their potential to contribute to a rethink, digital technologies have usually been used in a technology-driven way to upgrade our existing educational models". On such basis, she argues that the discrepancy between technological potentials and educational praxis does not only result in missing new opportunities, but more importantly in losing touch with the reality (2008: 521).

The strong focus of the dominating e-learning discourse to information and communication technologies is being criticised from a wide spectrum of perspectives. However, such focus has not emerged from thin air: on the contrary, it has a convincing historical explanation. At the dawn of e-learning it was essential to build adequate technological infrastructure: only a decade ago, the majority of e-learning development has happened in the field of information and communication technologies. However, the discipline of e-learning has developed very quickly. Consequently, the focus to information and communication technologies has been slowly but surely replaced by the focus to pedagogies, management and wide social consequences such as accessibility (Zemsky and Massy, 2004: 9-12, Jandric, 2012). On such basis it is safe to conclude that e-learning practitioners should be offered a curriculum which provides a more rounded, holistic view to the discipline of e-learning.

Education is dialectically intertwined with the society. Our current social reality inevitably evolves from massive society characterised by one-way media such as radio, television and press to the network society powered by the Internet. Furthermore, even the most common concepts based in the massive society are incommensurable with concepts based in the network society (van Dijk, 1999; Castells, 2001). For instance, traditional concepts of work and play significantly differ between digital natives and digital immigrants (Prensky, 2001).

Following the long tradition from Kuhn's paradigms (1970) to Foucaults's discourses (1972), therefore, it can confidently be concluded that the new curriculum based on the fresh view to the discipline of e-learning in the context of network society cannot be derived from the old concepts which belong to the massive society. Instead, as Baudrillard poetically asserts, using information and communication technologies in education represents "a passage through an indefinable space" and "a kind of radical uncertainty" (2006). In order to develop a contemporary curriculum, therefore, this research needs to explore the very basis of the emerging discipline of e-learning in the context of the contemporary network society.

The Question Concerning e-Learning

In *The Question Concerning Technology*, Heidegger starts his critique with ontological analysis. Based on Aristotle's ideas, he asserts that "that which pervades every tree, as tree, is not itself a tree that can be encountered among all the other trees. Likewise, the essence of technology is by no means anything technological"(1977: 4). Heidegger continues the quest towards the essence of technology using Aristotle's four types of causes: material cause, formal cause, efficient cause and final cause. Material cause is the material of which something consists; formal cause is its form or arrangement; efficient cause consists of work invested into production; and final cause is a things' aim or purpose (Cohen, 2012).

On such basis, Heidegger compares the contemporary idea of production as an activity based on the final cause with the wholesome approach of the craftsman who gathers all causes in his activity or his efficient cause. The final form of the product, therefore, does not depend only on craftsman but on the complete aim of its existence. "Technology is therefore no mere means. Technology is a way of revealing" (Heidegger, 1977: 12), or bringing-forth all causes of an artefact during its production. Instrumentality is an integral part of bringing-forth, but bringing-forth is much more complex than instrumentality.

Bringing-forth stands “not only for the activities and skills of the craftsman, but also for the arts of the mind and the fine arts. *Techne* belongs to bringing-forth, to *poiesis*; it is something poietic” (ibid: 13). Instrumental views to technologies, however, reduce human beings to passive producers and consumers unable to reach their ontological vocation of active creators of their environment. In order to avoid the technological dystopia, therefore, explorations of the curriculum for e-learning should reach beyond instrumentality and explore bringing-forth of all causes within the discipline of e-learning.

In order to explore this conclusion in the context of the contemporary network society, the following analysis examines Dahlberg’s three main strands of Internet research “each focusing upon a different aspect of the ‘circuit of technology’: uses, artefacts, and social contexts”, which can be roughly described as Uses Determination, Technological Determination and Social Determination (Dahlberg, 2004).

Uses Determination

Uses Determination describes technologies as neutral tools, and focuses on their usage in educational processes. In the context of Uses Determination

> technology is merely a tool, open to both noble and nefarious purposes. Just as radio and TV could be vehicles of information pluralism and rational debate, so they could also be commandeered by totalitarian regimes for fanatical mobilization and total state control. Authoritarian states could commandeer digital ICT to a similar effect. Yet to the extent that innovative citizens can improve and better use these tools, they can bring authoritarianism down—as in several cases they have (Diamond, 2010, 71).

However, this approach is not completely accurate. Feenberg asserts that human control of technology is not fully instrumental, and illustrates his assertion using the heated debate between proponents and opponents of guns in the USA. From an instrumentalist perspective, *Guns don’t kill people, people kill people*. However, the social world in which anyone can purchase a gun is radically different from the social world where guns are illegal. In the world where anyone can legally purchase a gun, the choice whether to shoot is left to each gun holder. At the other hand, the choice whether to make guns illegal belongs to every voting citizen. The first kind of choice is indeed instrumental, while the second kind of choice is a meta-choice, or “a choice at a higher level determining which values are to be embodied in the technical framework of our lives” (Feenberg, 2003).

Uses Determination focuses on the ways that information and communication technologies are used in e-learning. In the field of pedagogy, it is interested in issues such as efficient delivery of educational materials and neutral assessment. In the field of educational management, it is concerned with issues such as cost and feasibility. In the field of educational policy, it is interested in understanding issues such as the material causes for the digital divide. By and large, the main prerequisites for Uses Determination are data collection and statistical analyses: therefore, its main research method is positivism.

Scholars of e-learning should be aware of Uses Determination for at least two reasons. First, Uses Determination is instrumental in important fields such as educational management and instructional design. Second, e-learning possess both oppressive and progressive potentials, and it is essential to understand the ways those potentials can be appropriated for the benefit of the society.

Technological Determination

Technological Determination recognises that information and communication technologies bring significant cultural changes and produce powerful social, psychological and other impacts. However, Technological Determination sees technologies as the given, external reality that shapes human destiny: in order to survive, human beings should adapt to technological development (Dahlberg, 2004). Within the framework of this tradition, Drucker asserts that

> the new industries that emerged after the railroad owed little technologically to the steam engine or to the Industrial Revolution in general. They were not its “children after the flesh” - but they were its “children after the spirit.” They were possible only because of the mind--set that the Industrial Revolution had created and the skills it had developed. This was a mind-set that accepted -- indeed, eagerly welcomed -- invention and innovation. It was a mind-set that accepted, and eagerly welcomed, new products and new services. It also created the social values that made possible the new industries. Above all, it created the “technologist” (Drucker, 1999).

In the context of e-learning Technological Determination focuses on social, cultural, psychological and other influences of information and communication technologies. This kind of understanding cannot be achieved by positivism. Instead, it looks beyond numbers in order to understand what people feel about using information and communication technologies in education. Locally, this kind of reasoning reaches much deeper than Uses Determination. For instance, Technological Determination is able to provide the exact explanation why a certain group of students or teachers enjoy using a certain technology. Unfortunately, however, Technological Determination is unable to provide sound generalisations. The relevant research methods include interviews, focus groups etc. In general terms, the main research method of Technological Determination is interpretivism.

Education primarily consists of more or less direct interaction between human beings. For now, automated educational systems simply cannot keep up with human contact (Anderson & Elloumi, 2004; Laurillard, 2008). For this reason, interpretivism has always been one of the main research methods in the science of education (Carr & Kemmis, 1986). In this respect, information and communication technologies do not introduce significant changes into the discipline of education. Therefore, scholars of e-learning should be well aware of Technological Determination.

Social Determination

Social Determination focuses on power relations, emancipation, criticism and liberation, i.e. issues such as ownership of educational institutions, price of education, access to technologies etc. Typical examples of Social Determination include studies of the division between digital haves and digital have-nots known as the digital divide and various technology-based adult education programmes. Social Determination is based on Freireian Promethean politics, which “sought to intervene on behalf of the poor, critically pose problems into the ‘facticity’ of their oppression, and divert technologies and other forms of cultural capital away from those in power towards those in need” (Kahn & Kellner, 2007: 437). This kind of understanding cannot be achieved by positivism and/or interpretivism (Carr & Kemmis, 1986). Instead, Social Determination should look at emancipatory knowledge using research methods that belong in the framework of critical theory.

The world where education is equally available to all social strata is significantly different from the world where only the rich can school their children. In the country where only the richest ten or twenty per cent of people have the opportunity to access Internet, e-learning becomes a powerful tool for social reproduction. Based on the dialectical relationship between education and society, it is obvious that issues such as ownership and control over information and communication technologies and price of education play a crucial role in the praxis of e-learning. For this reason, scholars of e-learning should actively engage in issues associated with Social Determination.

A Conceptual Framework for Curriculum for e-Learning

Uses Determination, Technological Determination and Social Determination reach specific kinds of knowledge that cannot be understood within theoretical frameworks of other determinations. The discipline of e-learning contains all determinations: for this reason, the same structure should be reflected to curricula for e-learning.

According to Dahlberg, "over-emphasizing a particular determination can lead to narrow or distorted understandings"(2004). Depending on context, therefore, curricula for e-learning should be carefully developed in order to provide adequate balance between determinations. For instance, modules about e-learning taught at schools of education will probably be focused to technologies, while modules about e-learning taught at schools of informatics will probably be focused to pedagogical and social aspects. The extent of such adjustments should be tailored in order to fit the specific context of each educational situation. Therefore, it is impossible to provide a more precise general recommendation.

As can easily be seen from the discussion about the main elements of curricula for e-learning, Uses Determination, Technological Determination and Social Determination correspond to Habermas's three main spheres of human interests: the technical, the practical, and the emancipatory (Tinning, 1992, 5). In order to provide an overview of the complete curriculum for contemporary e-learning, Table 1 lists spheres of interests, types of knowledge and research methods available for each determination.

Table 1. Spheres of interests, types of knowledge and research methods available for each determination (adapted from Tinning, 1992, 5).

Determination	Interest	Knowledge	Research methods
Uses Determination	Technical (prediction)	Instrumental (causal explanation)	Positivistic sciences (empirical-analytic methods)
Technological Determination	Practical (interpretation and understanding)	Practical (understanding)	Interpretive research (hermeneutic methods)
Social Determination	Emancipatory (criticism and liberation)	Emancipation (reflection)	Critical social sciences (critical theory methods)

Human beings can simultaneously engage in various kinds of activities without any theoretical and practical obstacles except timing: the world is packed with computer scientists who play music, physicians with profound knowledge of fine arts etc. In this context, curriculum for e-learning which consists of Habermas's three main spheres of human interests, types of knowledge and research methods is fully feasible. In the field of epistemology, however, certain types of knowledge and the associated research methods are mutually incommensurable. For instance, understanding of the rainbow derived from positivistic science has very little in common with its counterpart in the field of poetry (Carr & Kemmis, 1986). For this reason, the assertion that the discipline of e-learning consists of Habermas's three main spheres of human interests, types of knowledge and research methods has profound consequences for the discipline of e-learning.

Opportunities and Restrictions

In order to explore those consequences, one should investigate opportunities and restrictions arising from each combination of conceptual frameworks. Those combinations are:

1. Technical interest, instrumental knowledge and positivistic sciences with practical understanding, practical knowledge and interpretive research.
2. Technical interest, instrumental knowledge and positivistic sciences with emancipatory interest, emancipatory knowledge and critical social sciences.
3. Practical understanding, practical knowledge and interpretive research with emancipatory interest, emancipatory knowledge and critical social sciences.

During the past few decades, the combination of technical interest, instrumental knowledge and positivistic sciences and practical understanding, practical knowledge and interpretive research has been extensively debated under the name Quantitative-Qualitative Debate. A possible solution to the debate is mixed-methods research, which is advocated by a significant population of contemporary theorists of education because it provides a much broader insight into researched problems than any of the constituing methodologies. However, quantitative and qualitative methods are based on diametrically opposed theoretical frameworks. For this reason, mixed-methods research introduces various restrictions into validity of educational research (Howe, 1988 & 2001; Sale, Lohfeld & Brazil, 2002).

The combination of technical interest, instrumental knowledge and positivistic sciences and emancipatory interest, emancipatory knowledge and critical social sciences has also been extensively debated for years. In short, the underlying conceptual frameworks are incommensurable: instrumental knowledge and positivistic science are blind to issues associated with emancipation and vice versa. Up to an extent, however, positivistic and critical sciences can inform each other. This extent depends on the context of each research question and cannot be derived analytically (Carr & Kemmis, 1986).

Practical interest, practical knowledge and interpretive research are usually considered fairly close to emancipatory interest, emancipatory knowledge and critical social sciences. Interpretivism reaches deeper into the context of specific situations, while critical social sciences ‘sacrifise’ some of the individual focus in order to provide generalisations. However, there are several important differences between the two. For instance, interpretivist research implies that the position of the researcher is neutral, while critical theory recognises that the researcher is an inseparable part of the research (Mackay, Maples & Reynolds, 2001: 59). As opposed to critical research, “the interpretive approach encourages people to change the ways in which they *think* about what they are doing, rather than suggest ways in which they should change what they *are* doing” (Carr & Kemmis 1986: 98). Despite differences, interpretivism and critical social sciences can inform each other to an extent which depends on the context of each problem situation (ibid).

Towards a Transdisciplinary Research Methodology

In recent years it has become fairly common to inform e-learning research with approaches and conclusions arriving from various spheres of interest, types of knowledge and research methods. Despite popularity of interdisciplinary research, however, the internal conflict between Habermas's three main spheres of human interests, types of knowledge and research methods has always remained (Howe, 2001; Sale, Lohfeld & Brazil, 2002). In order to resolve this conflict, some recent authors have made one step further into the vast yet mostly unexplored field of transdisciplinary research. As opposed to interdisciplinary research, transdisciplinary research methodology implies

> that dialogue with other disciplines and theories is a source of theoretical and methodological development. This separates transdisciplinary research from some forms of interdisciplinary research which assemble different disciplines around particular themes and projects without any commitment to change the boundaries and relations between them. Transdisciplinary research is related to but distinguishable from 'post-disciplinary' approaches (Sum & Jessop 2001) which include a principled rejection of disciplines and a problem-oriented approach to research in which concepts, categories and methods are developed without regard for conventional disciplinary boundaries (Fairclough, 2007: 1).

Interdisciplinarity and transdisciplinarity offer a lot of potential for development of a unified e-learning research methodology. However, their complete elaboration reaches far beyond the scope of this paper. Fortunately, this research has a much humbler task: it only aims at informing curriculum development for e-learning. In this context, epistemological muddles are irrelevant and the research question can be answered clearly.

Conclusions

Based on Heideggers's ontological analysis of technologies, this study explores Dahlberg's three main strands of Internet research: Uses Determination, Technological Determination and Social Determination (Dahlberg, 2004). It shows that the discipline of e-learning is equally interested in Habermas's three main types of knowledge: technical, practical and emancipatory. In order to adequately reflect the nature of discipline, curriculum for e-learning should reflect all interests, introduce all types of knowledge, and equip learners with adequate tools for their exploration.

Curriculum for e-learning should equally introduce positivistic sciences and empirical-analytic methods, interpretive research and hermeneutic methods, critical social sciences and critical theory methods. However, simultaneous usage of different and often mutually incommensurable theoretical frameworks and research methods has profound consequences for the discipline of e-learning. For this reason, students of e-learning should also be introduced into various opportunities and restrictions arising from interdisciplinary and transdisciplinary research approaches.

At practical level, methodological issues are fairly irrelevant for curriculum development. However, successful curriculum should do more than just introduce students to the main theoretical and practical approaches. Instead, it should bring students to the very fringes of our current understanding of the discipline of e-learning such as methodological issues in e-learning research and expose them to the burning problems facing contemporary e-learning such as the discrepancy between technological potentials and educational praxis.

The proposed conceptual framework for curriculum development for e-learning aims at developing a balanced understanding of the dialectical relationships between technical, practical and emancipatory aspects of e-learning and the corresponding research methodologies. More importantly, it aims at developing genuine interest for pushing the current boundaries of the discipline of e-learning into the unknown. In this way, it provides opportunities for whole-rounded development of e-learning experts and creates potentials for fresh developments in diverse fields from research methodologies and policy making to everyday educational praxis.

Conceptual frameworks can only provide general theoretical overviews and rough practical guidelines. For this reason, detailed curricula for e-learning should be tailored according to specific contexts of each educational situation. Based on two equally important pillars – Heidegger's ontological analysis of technologies and Dahlberg's empirical classification of Internet research strands – this study is a direct product of the dialectical relationship between educational theory and practice. Therefore, the proposed conceptual framework for curriculum development for e-learning should be constantly examined from theoretical and practical aspects in order to provide guidelines for current educational praxis.

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THE INFLUENCE OF FREE PRIMARY EDUCATION ON KENYA CERTIFICATE OF PRIMARY EDUCATION PERFORMANCE IN KENYA

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Abstract

The origin of Free Primary Education (FPE) can be traced back to the 1948 Declaration of Human Rights where basic education was recognized as a human right. The current FPE programme was launched in 2003 and it led to an overwhelming enrolment of pupils at the primary level of education. Such a soaring enrolment is feared to have compromised the Kenya Certificate Primary Education (KCPE) performance, which is a key indicator of quality education. The study therefore aimed at determining the influence of high enrolment on; the ability of teachers to offer quality instruction; learning resources; management of pupils' discipline and suggestion on how to improve FPE in light of KCPE performance. The paper assessed FPE on KCPE performance in Kaptama Division, Mt. Elgon District, Kenya. The researcher used descriptive survey design. A sample of 310 respondents consisting of 253 standard eight pupils, 40 teachers, 13 head teachers and 4 education officers was used. The main tools of data collection were a questionnaire and interview schedule. Document analysis was also used in the study. Data analysis involved the use of frequencies, percentages, tables, chart, graphs and description. The findings of the study established that implementation of FPE led to high enrolment which witnessed high pupil - teacher ratio and ill-discipline among pupils. It has also led to inadequate learning facilities (classrooms, desks and chairs), fewer tests for pupils which lack in content and depth and increased work load among teachers. This has in turn compromised KCPE performance. Constant inspection should be carried out by the Ministry of Education for the success of the programme.

Key words: *free primary education, assessment, Kenya Certificate of Primary Education.*

Introduction

According to USAID (2001), education is the key to sustaining democracies, improving health, increasing per capita income, and conserving environmental resources. In this context, education can be seen as an investment in human skills which help to foster economic growth, enhance productivity, contribute to national and social development, and reduce social inequality. Free Primary Education (FPE) is not a new phenomenon in Kenya. Vos, Bedi, Kimalu, Manda, Nafula & Kimenyi (2004) observe that since independence in 1963 the Kenya government has committed itself to providing education to all primary school age going children. UNESCO (2002) though notes that the original FPE can be traced back to the 1948 Declaration of Human Rights where article 26 stipulates that 'elementary' education shall be free and compulsory. Kenya is one of the 189 United Nations (UN) member states which have committed themselves to achieving the Millennium Development Goals (MDGs) whose second goal is to achieve Universal Primary Education (UPE). The target is to ensure that by 2015, children everywhere, boys and girls alike will be able to complete a full course of primary school (RoK, 2005a). This re-affirms the commitment to provide Education For All (EFA) made by the same countries during the World Education Forum at Jomtein, Thailand, in 1990 and the Dakar Education Forum in 2000 (Kitamura, 2005). In the first two decades of independence the primary school level of education was characterized by non-enrolment, high dropout rates, low completion and transition rates, which could largely be attributed to the high cost of education that was worsened by the cost sharing policy that came into effect in 1980s (UNESCO, 2003).

Thus the National Rainbow Coalition (NARC) in her 2002 General elections campaigns promised FPE to its citizens. When it formed the government, NARC declared FPE in January 2003, as a fulfillment of one of the key pre-election pledges (Irin, 2006). The NARC government abolished the user charges in primary education and is committed to supporting FPE by providing instructional materials, teachers, and quality assurance services. This move resulted to an increase of about 1.3 million children in public primary schools in 2003 that translates to a Gross Enrolment Rate (GER) of 104 percent (RoK, 2005b). At the same time, there has been an increase of over 130,000 KCPE candidates representing 24.35 percent since the inception of FPE; which strongly indicates that many school drop-outs have re-entered school at various levels of education (MoEST, 2006). In the face of increased enrolment, the quality of primary education is at jeopardy especially in schools with shortage of teachers and limited textbooks (MoEST, 2003a). Although the government's policy on FPE is laudable, its implementation is besieged by a multitude of challenges that include inavailability of physical facilities, school furniture, equipment and teachers (Vos et al, 2004). It is in light of this that the researcher assessed the influence of Free Primary Education on Kenya Certificate of Primary Education performance in public primary schools in Kaptama Division, Mt. Elgon District in Kenya.

Statement of the Problem

The implementation of FPE witnessed a drastic increase in enrolment, shortage of teachers, lack of clear guidelines on admission, delay in payment of funds and expanded roles for head teachers (UNESCO, 2005). World Bank Report (2003) on Kenya's educational development, one year after KANU's rule, adds that the school system was ill equipped to cope with increased demands for education hence intense competition for places leading to poor-quality teaching. The situation has been aggravated by the fact that since 1998, the government suspended the recruitment and employment of teachers except for replacements to cater for natural attrition (MoEST, 2003b). According to UNESCO (2005), HIV/AIDS pandemic is killing teachers quicker than replacements can be trained. In the face of increased enrolment, in public primary schools the above-mentioned factors conspire in diluting the quality of education and hence poor performance in KCPE. It is in light of this that the researcher assessed the influence of FPE on the performance of standard eight pupils in KCPE in public primary schools in Kaptama Division, Mt. Elgon District in Kenya.

Purpose and Objectives of the Study

The purpose of the study was to investigate the influence of free primary education on KCPE performance in Kenya. The study was guided by the following objectives;

i. To determine the influence of increased enrolment on the ability of teachers to offer quality education in public primary schools in Kaptama Division.
ii. To assess the influence of FPE on learning resources in primary schools in Kaptama Division.

iii. To determine how enrolment has influenced the management of pupils' discipline in public primary schools in Kaptama Division.

Literature Review

Quality of Teaching

According to Nasibi (2003), teaching is a process that facilitates changes in learners. A teacher therefore is considered not to have taught until a pupil has learned. Similar views are held by Brown (1992) who observes that a person might as well say he has sold when no one has bought, as he says he has taught when no one has learned. Abagi and Odipo (1997) associate quality of education with students' levels of academic performance in national exams. According to them, if the student's achievement is low then the school is purported to be of low quality. Booker (1978) is of the opinion that in higher achieving schools, teachers tended to use more instructional activities in which groups of students competed as teams rather than individuals. Adams (1971) also points out that low quality teaching can result in frustration and boredom of the learner who may eventually drop out of school.

In a comparative study of low and high achievement among pupils in rural and urban schools in Malawi, Salamba (1983) found out that teachers qualification affect pupils` performance. UNESCO (2005) reports that 30 million teachers are needed to achieve EFA by 2015, and as a result, some countries are recruiting low paid and poorly trained 'voluntary' teachers. The Kenya government should therefore move faster in addressing the inadequacy of the teaching force since according to Mwai (2011) at the present Kenya has a deficit of 80,000 teachers in primary schools. Thus the government had resolved to hire 20,000 annually on contract for three years to address the 80,000 deficit.

Learning Facilities

Mwamwenda and Mwamwenda (1987), reporting on the study carried out on the effects of a school's physical facilities on the performance of standard seven pupils in examinations, in Malawi, established that availability of such facilities had a direct link with the performance of pupils. Such findings are in consensus with Heinemann's (1984) study which evaluated the impact of availability of textbooks in the teaching of Pilipino, mathematics and science and found out that there exists a positive relationship between the availability of textbooks and academic performance.

According to the Presidential Press Service (December 9, 2004), the implementation of FPE intended to abolish all levies for tuition in primary education and the government development partners were to meet the cost of instructional materials, teachers' salaries, co-curricular activities and wages for critical non-teaching staff. The parents were expected to refurbish the existing learning facilities. But then, there is a diminished community support to the programme following a misconstrued notion by the parents that provision of learning resources is solely the duty of the government (RoK, 2005c).

Many countries that have had a longer experience of FPE, like Malawi, which implemented the policy in 1994 face many challenges. A committee which was appointed in November 2005 to probe on the poor performance of pupils in examinations pointed out that the increased number of candidates and examination centers overstretched the human resource available to the extent that security, reliability and validity of the examinations has been comprised (UNESCO, 2005).

Available literature indicates that many African countries including Kenya, lack enough funds for procuring adequate learning facilities. In Kenya, the remuneration of teachers accounts for 71 per cent of the whole recurrent education budget (RoK, 2005c). Kess (2005) also observes that the country needs money to pay the teachers; there are not enough textbooks, not enough space in schools, the infrastructure in the majority of schools is falling apart and not safe. Many of the schools do not even have the necessary sanitation facilities which are needed by the girls.

Pupils' Discipline

The implementation of FPE policy opened floodgates to enthusiastic learners who had been kept out of schooling. Unprecedented high enrolment is therefore the biggest challenge facing the countries embracing FPE. In Malawi, UNESCO (2005) reports that it is difficult to discipline a class of 200 children giving rise to rowdy behavior. In Kenya, it is trickier to handle tens of thousands of 'over-age' and street children who wish to return and complete their primary education and often bully young and brighter ones (UNESCO, 2005).

Methodology of Research

The study used a descriptive survey design. The design was used to investigate the current situation in Kaptama Division with regard to the effects of FPE on KCPE performance. Cohen and Morrison (2000) observe that the intention of a survey research is to gather data at a particular point in time and use it to describe the nature of existing conditions. Thus the design enabled the researcher to obtain the respondents opinions on the effects of FPE on KCPE performance in Kaptama division.

The study comprised 253 standard eight pupils, 53 standard eight teachers, 14 head teachers and 4 education officers from Kaptama Division, Mt. Elgon District. Standard eight pupils were targeted because they are consumers of the FPE while their teachers are implementers of the programme. The head teachers and education officers were chosen since they supervise the implementation of the programme. Thus, stratified random sampling technique was used to select the standard eight pupils while Purposive sampling technique was used to select seven top schools and seven bottom performing schools in KCPE. Purposive sampling technique was also used to select the Education Officers in the division. This is because they are the ones who supervise the implementation of the government policies in education within the divisions.

The study used an interview schedule, observation schedule, document analysis and a questionnaire to collect data from the education officers, head teachers, teachers and pupils. The questionnaires contained both open ended and closed-ended questions that were used to obtain a variety of information from pupils and their teachers. The interview schedules were used with the head teachers and education officers. Observation schedule was also used and this accorded the researcher time to think and make opinion on what was observed in terms of availability and adequacy of the teaching-learning resources. In document analysis, the researcher analyzed the type, purpose and length of tests that were administered to pupils and sought comments about it from the education office. The data generated by the study was analyzed by use of descriptive statistics. It was then presented by use of frequencies, percentages, tables and graphs.

Results of Research

The study sought views from education officers, head teachers, class eight teachers and their pupils. Data was obtained on the effects of increased enrolment in the following areas; KCPE performance, teachers` workload, tests administered per term, teaching methods, pupils' discipline and adequacy of learning resources.

Results of the Education Officer's Response on KCPE Performance

The research instruments sought to find out the KCPE performance in Kaptama Division. The findings of the study are in indicated in Figure 1.

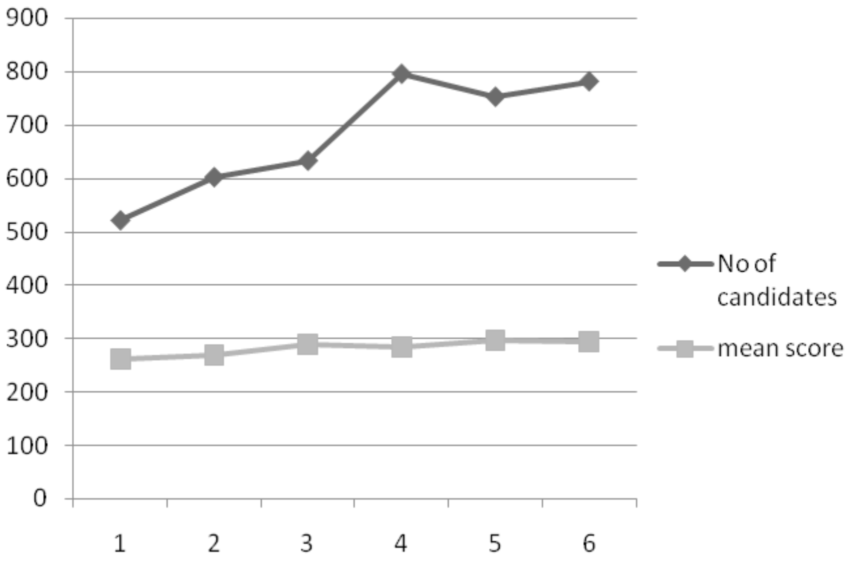

Figure 1: A line graph showing KCPE mean score and the number of candidates in years 2005- 2010.

The data shown in Figure 1 above indicate that the number of candidates increased from 2005 to reach a peak of 796 in 2008. At the same time, the general performance of the division does not show a steady improvement in KCPE.

Findings on Teachers and Head Teachers' Workload

The study therefore sought views from respondents on teachers' workload from the teachers and head teachers respectively. Workload was in this case assessed by the number of lessons per week, teacher- pupil ratio and other responsibilities before and after the introduction of FPE.

Table 1. A Table showing distribution of teachers and head teachers responses on workload (N=53).

Workload	Teachers responses		Head teachers responses	
	N	%	N	%
Increased	40	100	13	100
Constant	0	0	0	0
Decreased	0	0	0	0
Total	40	100	13	100

The findings in Table 1.0 reveal that all teachers (100%) concur with head teachers (100%) that high enrolment occasioned by FPE increased; their number of lessons per week, the teacher-pupil ratio and other responsibilities. Teacher- pupil ratio was found to be 47:1 which means that the high pupil-teacher ratio in all the sampled schools exceeded the recommended ratio of 40:1. Kenya Paul (2008) observes that increased workload; congestion in classes, unbalanced Pupil-Teacher ratio and poor infrastructure has affected the quality of education with some parents moving children to private schools. This implies that the increased workload and the high pupil-teacher ratio are likely to impact negatively on KCPE performance.

Tests Administered per Term

Pupils, teachers and head teachers responses on the number of tests administered per term were also sought. The results are tabulated in table 2.

Table 2. A Table showing distribution of respondents based on tests given per term (N=253).

Number of tests	Pupils responses		Teachers responses		Head teachers responses	
	N	%	N	%	N	%
Less than 2	81	40.5	10	25	0	0
3-4	100	50.0	20	50	8	61.5
5-6	19	9.5	10	25	3	23.1
Above 6	0	0	0	0	2	15.4
Total	206	100	40	100	13	100

The results in Table 2 indicate that most schools sampled administer tests to their pupils three to four times per term according to pupils (50%), teachers (50%) and head teachers (61.5%). It was revealed that this was much lower than what the testing policy that most schools prescribe (six times). The tests that were sampled and taken to the divisional education office for advice in their depth (content), purpose and length were found to be lacking in all the three aspects. Most papers lacked focus and were too short for the level of pupils they were meant to test. The education office found out that most of the papers were below standard and were set with an aim of being easier to mark. Thus a lack of adequate testing by teachers might be a possible contributor to poor performance in KCPE in Kaptama division. It is therefore clear that high pupil-teacher ratio, low quality tests and inadequate testing of pupils' compromises quality of education.

Distribution of Teachers and Head Teachers According to Teaching Methods

Table 3. A Table showing distribution of teachers and head teachers according to teaching methods (N=53).

Teaching methods	Teachers responses		Head teachers responses	
	N	%	N	%
Lecture	23	57.5	4	30.8
Discussion	8	20	4	30.8
Demonstration	2	5	2	15.3
Other teaching methods	7	17.5	3	23.1
Total	40	100	13	100

The data in Table 3 reveal that lecture method is commonly used while demonstration method is least applied. 57.5% of the teachers and 30.8% of Head teachers reported that the lecture method of teaching was commonly used due to the increased number of pupils and increased workload. The least used method is demonstration according to teachers (5%) and head teachers (15.3%). Some of the teachers (17.5%) and head teachers (23.1%) observed that they did not only use one method of teaching but a combination of many teaching methods. The use of the lecture method by many teachers limits a closer interaction between pupils and teachers which is necessary for the provision of quality instruction. This also limits the chances of integrating various child-centered techniques in instruction delivery, which is a relevant ingredient to quality learning.

Results of Head Teachers' Response on KCPE Performance

A majority of head teachers indicated that majority of the schools had a mean score of between 200 and 250 since 2005 to 2010. None of the schools has ever attained a mean score higher than 300 marks. The results of the head teachers' responses are shown in table 4.

Table 4. A table showing head teachers' responses on KCPE performance (N=13).

Year	Below 200		200-250		251-300		Above 300	
	N	%	N	%	N	%	N	%
2005	0	0	9	69.2	4	30.8	0	0
2006	1	7.7	8	61.5	4	30.8	0	0
2007	4	30.8	6	46.2	3	23.1	0	0
2008	1	7.7	8	61.5	4	30.8	0	0
2009	2	15.4	7	53.8	4	30.8	0	0
2010	0	0	7	53.8	6	46.2	0	0

The result shown by the data in table 4 indicate that most of the schools had an average mean mark of between 200 -250 (53.8%), in the last six years. It can also be observed that no school has ever had a mean score of above 300 marks (0.0%).

Pupils, Teachers and Head Teachers' Response on the Extent to which the Learning Materials are Adequate for all the Pupils Enrolled

The study sought to establish pupils, teachers and head teachers` response on the extent to which learning materials are adequate for all the pupils enrolled in schools. The results of responses are contained in table 5.

Table 5. A table showing pupils, teachers and head teachers response on the extent to which learning materials are enough for all the pupils enrolled in schools (N=253).

Learning resources	Pupils response				Teachers' response				Head Teachers' response			
	Adequate		*Inadequate*		*Adequate*		*Inadequate*		*Adequate*		*Inadequate*	
	N	%	N	%	N	%	N	%	N	%	N	%
Classrooms	105	52.5	95	47.5	0	0	40	100	0	0	13	100
Desks	35	17.5	165	82.5	0	0	40	100	3	23.1	10	76.9
Chalk Boards	88	44	112	56	0	0	40	100	4	30.8	9	69.2
Text Books	30	15	170	85	0	0	40	100	5	38.5	8	61.5
Exercise Books	0	0	200	100	0	0	40	100	5	38.5	8	61.5
Teaching Aids	100	50	100	50	0	0	40	100	2	15.4	11	84.6

The findings on table 5 established that resources provided were adequate for all the pupils in school. For instance, the least provided learning resource according to pupils was exercise books (100%) and head teachers cited classrooms (100%). The teachers` observed that learning materials, classrooms (100%), desks (100%), chalk boards (100%), text books (100%), exercise books (100%) and teaching aid (100%) are not enough for all the pupils. None of the schools sampled had a library. According to the responses expressed by pupils, teachers and head teachers, inadequate learning resources have led to a drop in KCPE performance. The parents were expected to refurbish the existing learning facilities. But then, there is a diminished community support of the programme following a misconstrued notion by the parents that provision of learning resources is solely the duty of the government.

Teachers and Head Teachers' Responses on Pupils' Discipline

The teachers and head teachers were also asked to give their opinions on whether more and more pupils were getting ill-disciplined in their school. The following table 6 gives a summary of the teachers` and head teachers` responses.

Table 6. A table showing the distribution of teachers and head teachers' responses on pupil discipline (N=53).

Discipline level	Teachers responses		Head teachers responses	
	N	%	N	%
Discipline has improved	0	0	3	23.1
More pupils are getting ill-disciplined	40	100	10	76.9
Total	40	100	13	100

According to the findings of the study, high enrolment led to more and more pupils were becoming ill-disciplined in schools. FPE programme never had a clear admission criterion and as result pupils of diverse educational background joined school. The head teachers do not supervise pupils closely as before because of expanded role of managing FPE funds. 100% teachers and 76.9% head teachers sampled agreed that a majority of the Pupils` discipline had deteriorated. For instance, according to class registers, there were previously fewer cases of absenteeism as compared to the situation after the introduction of FPE. According to the teachers the numbers of suspensions have also increased significantly as a result of bullying in school mostly involving the over age students.

Pupils, Teachers, Head Teachers and Education Officer Suggestions on Ways of Improving the FPE Programme

The researcher also sought the suggestions of pupils, teachers, head teachers and education officer on ways in which the FPE programme can be improved. Their suggestions on ways of improving FPE programme are contained in table 7.

Table 7. A table showing distribution of pupils, teachers, head teachers and education officer according to suggestions (N=254).

Suggestions	Pupils response		Teachers response		Head teachers response		Education officer response	
	N	%	N	%	N	%	N	%
More teachers	100	50	21	52.5	7	53.8	1	100
Remunerations	2	1	8	20	2	15.4	0	0
Provisions of funds	18	9	5	12.5	3	23.1	0	0
Extra tuition	40	20	2	5	0	0	0	0
Boarding facilities	40	20	4	10	1	7.7	0	0
Total	200	100	40	100	13	100	1	100

Table 7 indicates that for the success of FPE, more teachers should be employed with pupils (50%), teachers (52.5%), head teachers (53.8%), and education officer (100%) agreeing on the same. Other views given included; better remuneration of teachers, increase funding for procuring more educational facilities, provide boarding sections for candidates and extra tuition for weak pupils.

Discussion

The government's key concerns on FPE include quality and relevance, and internal and external efficiencies within the education system. Despite this the overall performance in the schools in Kaptama division is below average and has declined in the last seven years since the new education policy of FPE. The study findings are in consensus with the study of Eshiwani (1983) that, lack of frequency in testing and marking pupils work by teachers contributes to poor levels of performance. The study found out that teachers are overwhelmed with work because of the increased number of students in schools. This is so because when students are joining school due to FPE, not enough teachers are being employed by the government to correspond with the enrolment. Sifuna, (2005) observe that overcrowded classrooms and overburdened teachers are likely to negatively affect the quality of education being offered.

The study also found out that the most commonly used teaching method in schools is the lecture method. Demonstration and discussion methods are also used but most teachers preferred the lecture method due to the increased number of pupils and increased workload. This method of teaching has a lot of limitations in the provision of quality instruction especially if used on primary school pupils where a closer interaction between the pupils and teachers is necessary.

The study findings revealed that discipline in school has declined considerably due to lack of a clear admission criterion, which concurs with an assessment report by UNESCO (2005), which observed that over-age pupils often bullied young ones. Thus through FPE's policy of over age admission, discipline in schools has deteriorated leading to falling academic standards. Yieke, (2006) also observes that congested classrooms, limited physical facilities and shortage of qualified teachers has negatively impacted on the quality of teaching and learning on one hand and contributed to indiscipline in schools on the other.

The study found out that many parents thought that with the introduction of FPE all school levies were to be shouldered by the government. But this was not the case. According to RoK (2005c) the implementation of FPE was intended to only abolish tuition fee in public primary schools. The government and its development partners were only to meet the cost of instructional materials, teachers' salaries, co-curricular activities and wages for critical non-teaching staff while the parents were to meet the costs of other non-discretionary items. But due to scarcity of finances by the government it has led to inadequate provision of the teaching learning materials which are essential for attainment of any good results in KCPE.

Conclusion

The findings of this study show that following the implementation of Free Primary Education, the teachers` workload increased, most schools administer three to four tests per term while the lecture method is the commonly used mode of instruction. Introduction of FPE also resulted in high enrolment. Since the introduction of FPE more and more pupils have become ill- disciplined in schools. Learning resources have also become inadequate.

The study therefore recommends that more teachers should be employed to reduce the increased teachers` workload so that teachers can effectively attend to pupils. More funds should also be allocated to schools by the government to procure more teaching-learning resources. The NGOs and international partners should financially support Free Primary Education for the success of the programme. Lastly the study recommends that constant inspection should be carried out by the Ministry of Education for the success of the programme.

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MODERN DIDACTIC TOOLS AND THE POSSIBILITIES OF THEIR IMPLEMENTATION INTO THE EDUCATIONAL PROCESS

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Abstract

Information and communication technologies bring a great amount of positive effects that appropriately enrich and support education. The generally declared need for the integration of new media and educational technologies in the educational process could represent an important impulse for the development of pedagogical sciences. As a result of this fact, it is necessary to promote new educational techniques and methods derived from them and thus there arises a question whether schools, teachers and teachers-to-be are ready for such a thing. Since the authors of the presented study are not aware of any available analysis dealing with this issue, we have decided, based on carrying out a research, to identify the interest and preparedness of schools or teachers, included teachers-to-be, in the implementation of modern didactic tools into the educational practice in form of interactive whiteboards. The presented study introduces the progress, process and result of this significant research.

Key words: *didactic tools, digital technologies, information and communication technologies, interactive board, multimedia, multimedia presentation, research.*

Introduction

Didactic tools (compare Průcha, 1995; Maňák, 2003; Janiš, 2006) are part of tuition since the beginning of cultural history of mankind and can be generally defined as "*all means and features that provide, require and improve the efficiency of tuition and with the usage of appropriate educational methods and organisational forms; they assist in reaching the pedagogical-educational goals"* (Průcha, 2009). The aim of didactic tools is especially to apply the principles of clearness (Nikl, 2002), as in tuition, if possible, all the senses should be involved in getting to know the reality. The recent researches relate to this fact and they have confirmed that the visual processing of information is more effective because we receive information in 87 % by sight, 9 % by hearing and 4 % by other senses (Průcha, 2009).

In the days of boom of information and communication technologies, modern didactic tools which are based on digital technologies and *multimedia* (Sokolowsky, Šedivá, 2002) have become prominent for teachers. *"Multimedia is computer-integrated and time dependent or independent media that can be interactively, that means individually and selectively, developed or processed"* (T. Svatoš, in Průcha, 2009). According to N. and J. Chapman (2001) it is possible to derive particular parts of multimedia presentations that *"are processed by demanding technical composition where computer technology plays the main role – it is the only way to transfer information from different sources into the same process called digitalisation"* (Chapman,& Chapman, 2001). Multimedia presentation is thus "new" type of educational material that consists of several basic parts enabling the full usage of digital technologies in the educational process. The basic parts of multimedia presentation consist of (1) hypertext; (2) the graphics of images; (3) sound; (4) video; (5) animation (Chapman, Chapman, 2004) and can be defined as: "*one of new educational technologies which uses parallel effect of pedagogical information from various media sources in order to reach the educational intentions and these sources are intentionally and practically gathered (usually in an electronic form) and interactively offered to the tutor for the sensual perception and mental process"* (T. Svatoš, in Průcha, 2009). Interactive boards are a suitable technological means of presentation for multimedia presentations created and structured in this way (Dostál, 2011). These boards are in short called i-boards (Finney, England, 2002). An interactive board is thus one of the ways to innovate the teaching process and make use of all the possibilities of multimedia presentations. *"The word innovation is usually perceived as a development and practical implementation of new features into the educational and learning system. The aim of the innovation is to improve the quality of this system."* (Skalková, 2007).

All the presented facts make new demands on teachers who have to be prepared to work with modern didactic tools and technologies and create appropriate educational materials for such tuition. This need stems not only from the practice but also from the necessity to accept modern paradigms of teaching where constructivism is its flagship (Průcha, Walterová, Mareš, 2003) and it perceives the importance of student's inner conditions of learning as well as their contact or interaction with the environment. That is why in this modern teaching paradigm new demands are made on a teacher and even though the teachers do not necessarily need to be ICT experts they should be able to make use of them in tuition where their role should be, above all, students' advisor (Jonassen et al., 2003). These demands can be defined via the TPCK model (Technological Pedagogical Content Knowledge) by L. Shulman (1986), in Czech – technological-didactic knowledge of content, according to Zounek and Šeďová (2009) or Janík (2005) who was further elaborated by P. Mishra and M. Koehler (Mishra, Koehler, 2006). This model uses three dimensions: (1) pedagogical dimension; (2) content dimension; (3) and technological dimension that all accept the fact that teaching is a complex activity requiring various types of knowledge (understanding, skills and attitudes), *"and understanding its principle means to penetrate into the complex net of their inter-relationships"* (Šimonová et al., 2010).

According to Brdička (B. Brdička, in Sojka, Rambousek eds., 2009), integration of ICT in the tuition is possible only based on a real modification of teaching processes. Newly outlined content that educates teachers is composed of, according to above given TPCK, four parts. The first one is the earlier mentioned didactic knowledge of content (Pedagogical Content Knowledge – PCK) that stems from the original Schulman's concept. This concept, according to Mishra and Koehler, contains knowledge how to approach the educational content and organise it in order to be transmitted as effectively as possible.

The second part deals with the interconnection of teaching and technologies (Mishra, Koehler, 2006). As a result, technological knowledge of the content is formed there (Technological Content Knowledge – TCK), to be more specific, this knowledge describes which technologies are appropriate for the particular educational content. This means that the principle is not only in the knowledge of the taught subject or issue, but also in the way the subject is adjusted using the ICT.

The next part connects the field of didactic knowledge with the technological knowledge (Mishra, Koehler, 2006), which results in a new educational field, so called technical-didactic knowledge (Technological Pedagogical Knowledge – TPK). This field represents not only the knowledge of the existence of various technologies usable in education, but also the knowledge of the fact that these technologies have various tools and possibilities applicable in tuition. This means that it is necessary for the teacher not only to know of the various technologies, but also be familiar with their possibilities and limits that can be brought in the tuition.

The last part is an intersection of the three above mentioned fields. Mishra and Koehler

(2008) talk about so called technological-didactic knowledge of the content (Technological Pedagogical Content Knowledge – TPCK) made by a new form extending significantly further then its three parts. Technological-didactic knowledge of the content is according to earlier mentioned authors (Mishra, Koehler, 2006, 2008) the foundation of effective education that requires from the teacher, above all, understanding the usage of technologies. *"Only the combination of all necessary knowledge (technological-didactic-subject) makes the teacher a unique and irreplaceable master of their field who is able to help transfer learning towards higher forms in the current world conditions."* (Brdička, 2009). One of the groups of knowledge required for exploration of truly modern and effective tuition at schools is, indeed, multimedia presentation preparation and its usage in the educational process through an interactive board.

Interactive Whiteboard in Tuition

Interactive board is a touch-sensitive surface that enables active mutual communication between the user and the computer aiming at providing the maximal possible objectivity of the presented content (Dostál, 2009). It is usually used together with a computer and a projector and, with the help of the interactive board; the users are able to influence the computer and the running programs. Thanks to the projected image on the interactive board (especially where the changes are in progress) it is possible to follow the current state on the computer output in the real time (J. Dostál, in Klement et al., 2011a).

The traditional connection interactive "board - projector - computer" is still accompanied by other features such as voting machine through which we can very quickly and precisely find out the rate of gained knowledge and consequently involve students in the tuition.

Based on a series of direct tuition observations where the interactive board has been used (Klement et al., 2011b) the following advantages of interactive boards usage can be deduced (J. Dostál, in Klement et al., 2011a):

- students can be motivated more effectively using the interactive board appropriately;
- the study material can be visualised, it is possible to use animations, move objects, the principle of objectivity is applied;
- enables to keep the longer attention of students;
- earlier created materials can be reused or easily corrected;
- students can get actively involved in the tuition more easily ;
- the text written in the actual tuition can be easily saved and shared with other students through the internet;
- students develop their information and computer literacy, that is crucial nowadays, while working with the board.

It proves that the trend in equipping schools with interactive boards can lead in the fact that using interactive boards will be essential for teachers. Until now we have been able to come across isolated attempts which mainly deal only with partial integration issues within particular segments of learning material. Some of the so far realised researches (Klement et al., 2011b) clearly show high students' and pupils' interest in tuition supported by interactive boards and multimedia presentations. Tuition oriented in this way is considered by some authors to be *a new complex method* that should offer students funnier and less routine form of tuition and learning (compare Maňák, 1997; Betcher, Lee 2009, Klement et al., 2011a). It should involve students in cooperative class formation, which will lead in students' motivation to study.

Although there is a generally declared need for incorporating new media (i.e. multimedia) and new educational technologies (i.e. interactive board and its accessories) and promote new educational approaches and methods derived from them, the question is whether schools are ready for that at all. Since the authors of the presented study are not aware of an overall analysis dealing with this issue, we have decided, based on carrying out a research, to identify the interest and preparedness of schools and teachers in implementation of modern didactic tools and digital technologies. The progress, process and results of this analysis are presented in the following study.

Methodology of Research

Based on frequent impulses from primary schools that closely cooperate with Faculty of Education at Palacký University in Olomouc, the possibility of an exploration of a research which would monitor the interest in new technologies and educational methods of these schools was taken into consideration. On the basis of these starting points, a decision to carry out a thorough analysis of the needs for the exploration of education supported by modern didactic tools and digital technologies in three basic fields was made:

- the interest of the primary schools headmasters in the issue of interactive whiteboards and multimedia presentations incorporation into educational process,
- the interest of teachers from these schools in tuition focused on interactive board usage and necessary multimedia presentations forming,
- the interest and the preparedness of the Faculty of Education of Palacký University students in and with respect to the tuition supported by the use of an interactive whiteboard and the creation of the multimedia presentations related to its use

A form of questionnaire has been chosen as the basis of data collection that would enable to gather reliable and valid results (Foddy, 1994). This questionnaire has been formed for either each of the 3 fields investigated separately. The questionnaire was anonymous, which ensured the maximal real value. These questionnaires were distributed among particular target groups and after handing in continuously evaluated.

Two types of questionnaires have been used for every target group of the analysis separately. The research respondents could answer the specific presented questions only in a dichotomy scale – YES/NO (Horák, Chráska, 1983). It was assumed that this method was sufficient in this case and provided an adequate overview of teachers' and headmasters' interest in a particular type of activities that could enhance the education quality. The validity of that is supported by the fact that for the statistic results‘ evaluation an analysis of particular answers frequency in form of graphs and charts has been used. For the above mentioned reasons the standard research hypotheses were not formed, however, specific closed questions were defined with a dichotomy answer that was marked by the respondents in the questionnaire. Based on these facts in the next parts of the analysis, consider the conclusive outcome value when 60 and more per cent of the relevant research sample answered the asked question YES or NO was taken into consideration. In that case the question was evaluated in two ways – the target group either is or is not interested in the particular field and the further concern is or is not useful. In this area of the analysis, the collection of necessary data was started with the questionnaires distribution in regular meetings of faculty school headmasters, on the occasion of the beginning of academic term 2010/2011. Faculty school headmasters and headmistresses had the opportunity to fill in a questionnaire.

A total of 18 faculty schools headmasters and headmistresses dealing have answered these questions with the return of all 100.0 % in this research sample. To make the research complete, other 32 primary schools cooperating with the faculty through pedagogical practice have been addressed which meant there already existed applicable contacts. As a result, 50 headmasters and headmistresses from these schools have been addressed and they have been given the questionnaire mentioned above. Again, we can claim that the return of questionnaires reached 100.0 %. The composition of the respondents sample in this area of analysis is shown in the table below:

Table 1. The composition of research sample of headmasters and headmistresses dealing with primary education.

	Filled in questionnaires in total	Schools in total	Faculty schools	“Common schools”
The number	50	50	18	32
in %	100.0	100.0	36.0	64.0

In another field of research the collection of the needed data was started by a questionnaires’ distribution in 50 school institutions whose headmistresses or headmasters got involved in the first phase of the research. Even though this measure significantly narrowed the space for obtaining research data, it provided us with the possibility to compare the opinions of the headmasters and teachers working there. The questionnaire was aimed at the primary school teachers, in particular in two regions of the Czech Republic. In total, these questions were answered by 134 teachers teaching at both primary and secondary sub stages of primary schools and the questionnaire return rate was, in this part of the research sample, 59.6 %. The research sample composition in this part of the analysis is shown in the table 2 below.

Table 2. The teachers’ research sample composition.

	Distributed questionnaires in total	Filled in questionnaires in total	Men	Women
The number	225	134	33	101
in %	100.0	59.6	24.6	75.4

The last phase of the investigation research was started by the collection of the needed data through a distribution of a questionnaire to the students of the crushing majority of the study fields accredited at the Faculty of Education of Palacký University, which represented 11.2 of the total number of the students. Thus a total of 586 students of the Faculty of Education of Palacký University answered the questions and the return rate of the questionnaire for this part of the research sample reached the percentage of 85.1%. The research sample composition in this field of analysis is shown by the table number 3 below.

Table 3. The research sample composition with the students.

	Distributed questionnaires in total	Filled in questionnaires in total	Men	Women
The number	689	586	184	402
in %	100.0	85.1	31.4	68.6

Results of Research

The carried out analysis clearly shows the interest of school headmistresses or headmasters in modern didactic tools and technologies, since 84.0 % of them stated that they do have modern technology but only 22.0 % of their teachers are able to work with this technology. Furthermore, only 10.0 % of the schools have teachers that are able to create adequate educational material for the tuition organized in this way. In addition, 92.0 % of headmistresses or headmasters stated that they are definitely keen on pedagogical faculty graduates who would be able to use didactic tools and digital technologies, which means to operate interactive boards and create such multimedia presentations. The whole situation is even more obvious in this Figure 1.

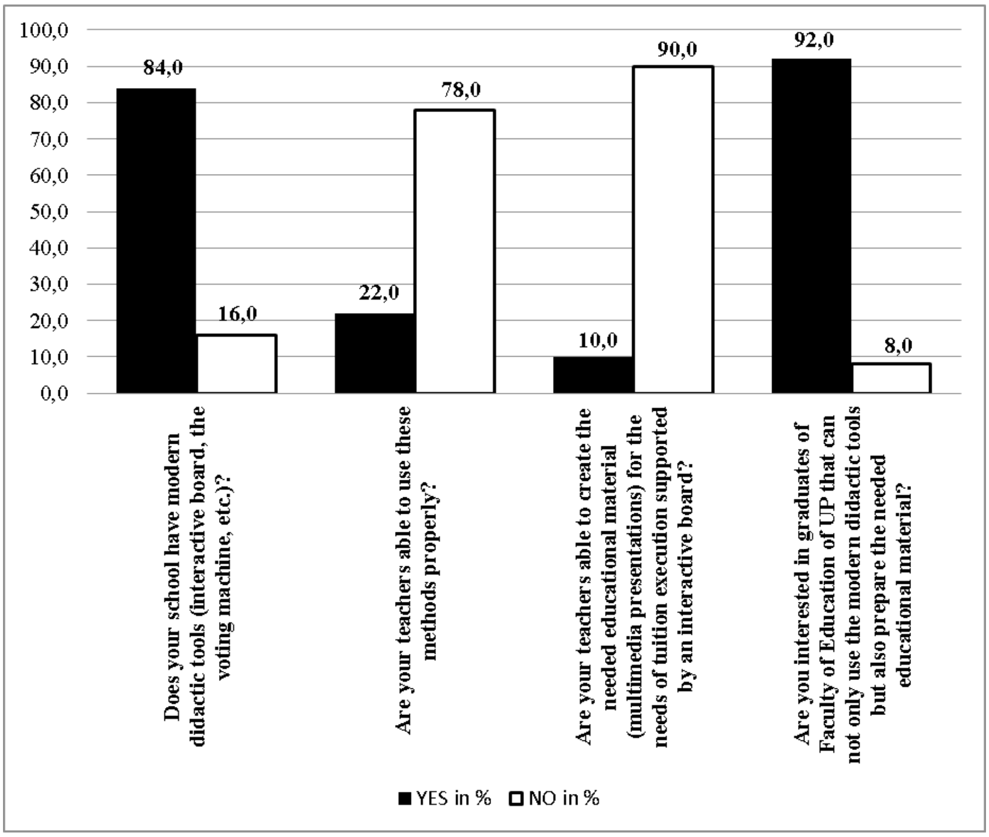

Figure 1: The research results with the group of school headmistress and headmasters.

According to the obtained results, shown in the previous text, there is an obvious interest of school institutions in teachers who are able to use modern didactic tools and digital technologies in tuition, which means to operate interactive boards and create multimedia presentations for them.

As the above stated analysis of the data obtained shows, there is an obvious interest of the current teachers in the issue of modern didactic tools and digital technologies usage. Even though 64.9 % said that they have come across these didactic tools, only 41.8 % of the teachers mentioned that they are able to work with this technology. Next, only 20.1 % of the teachers said that they are able to create appropriate educational material for the needs of such tuition. In addition, 83.6 % of the teachers stated that they are really interested in modern didactic tools and digital technologies service education and even 91.0 % said they are particularly interested in the education in appropriate educational material preparation. The whole situation is far more evident in the Figure 2 bellow.

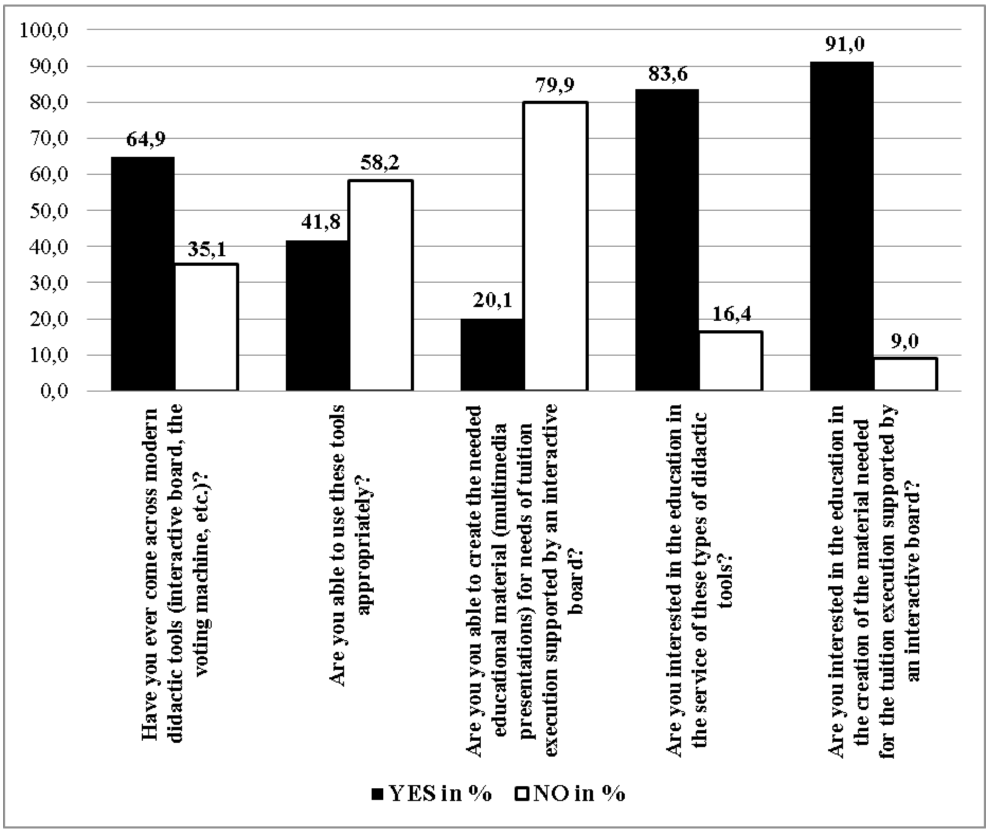

Figure 2. The research results with the group of teachers.

According to the obtained results there is a clear interest of primary school teachers in the field of modern didactic tools and digital technologies. What is more, they would be interested not only in the education in this field and the preparedness for their new role in the educational process but also in tuition which they execute themselves and that will be supported by interactive educational materials and tools.

As it follows from the above stated data, there is a clear interest among the teachers-to-be, i. e. students of the Faculty of Education at Palacký University, in the issues related to the use of modern didactic tools and digital technologies, since even though just 7.2 % of the students claimed that they had run across such tools, only 0.2 % of the students declared their ability to create necessary teaching materials related hereinto. It is regarded as gratifying that the majority of 70.3 % of the students declare themselves being imminently interested in further education in the field of the modern didactic means and digital technologies operation, and that, moreover, 73.5 % of the students characterized themselves as definitely interested in the training aimed at the preparation of the adequate educational materials. The whole situation is clearly shown by the graph number 3 below.

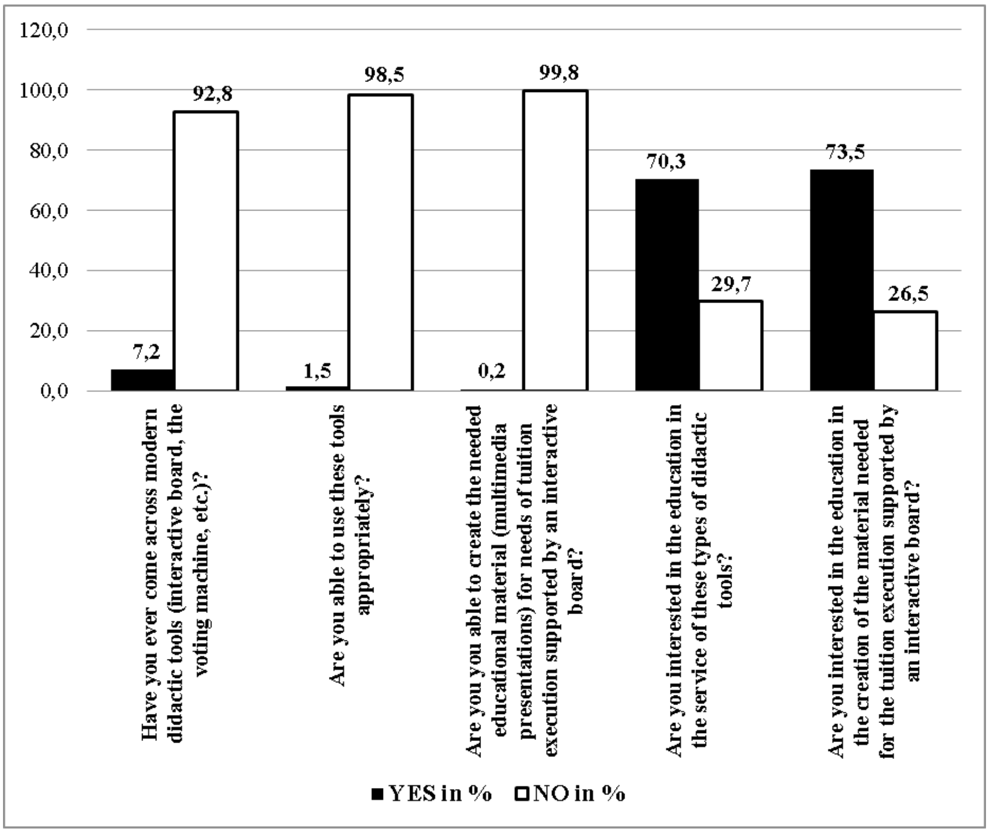

Figure 3. The research results with the group of students.

The above stated research results clearly demonstrate a definite interest of the students in the area of the didactic tools and digital technologies. The students would appreciate further education in this area which would help them in the process of the preparation for their future role in the educational process.

Furthermore, the informational value of the results is supported by the carried out analysis of the reliability of the questionnaires used. The former was assessed using the Cronbach`s alpha coefficient. With the first questionnaire (headmasters and headmistresses), the coefficient reached the value of 0.92, the second questionnaire (teachers, both male and female) showed the value of 0.94, and with the third questionnaire (students- teachers to be), the value of 0.87 was obtained. The acquired results were also examined from the point of the view of their potential dependence of the gender and age of the respondents via Student's t-test for independent groups. In neither case, the dependence of the results was not proved.

The outputs of the analysis thus suggest that modern educational tools have become an integral part of the educational reality. Headmasters as well as teachers come across such tools in everyday practice and make use of them. However, there is a gap between the expectations of school principals with respect to the extent to which teachers should, according to the former ones, be ready to make use of the above mentioned educational tools and prepare the corresponding support material, and the level to which teachers are actually ready to do so. The discrepancy could result from the fact that however well schools are equipped with the necessary devices and technology, the teachers themselves have not been well trained as regards the use of the latter in the educational process.

Students, however, meet with the tools in question only occasionally throughout their studies, and are therefore prepared neither to adequately handle them, nor to create the necessary support materials. This situation is probably due to the fact that the use of modern educational tools has not so far be focused on enough within the framework of the professional training of the future teachers. All the three groups of respondents declared their clear interest in the education of future and current teachers in this area. This agreement stems probably from the absence of a lifelong learning program for teachers and from the lack of emphasis on the application and use of modern didactic tools within the framework of the preparation of pregraduate students.

Discussion

The idea of natural ICT usage, which means modern didactic tools, among nowadays students is a fact supported by two main arguments. The first one draws from the fact that nowadays children use and handle modern IT with absolute certainty and self-confidence.

The second reason comes from the ICT usage statistics based on age showing that unlike the older generations, almost all children use the Internet and computer (Lupač, 2011). American author Don Tapscott (1998) based his theory on these two arguments in 1998 claiming that the powerful family model is corrupt because it is the children who educate their parents how to live in the digital environment. His label *N/GEN* and *digital generation* was soon supported by others: *digital natives* (Prensky, 2001), *homo-zappiens* (Veen, Vrakking, 2006)*, digitally born* (Palfrey, Glasser, 2008) and others. *"Digital natives are used to getting information very quickly. They like doing more activities at the same time (multitasking). They prefer working with the picture material before text. They also prefer random attitude towards information (hypertext) and they like working in the net environment (online) best. They expect immediate praise and frequent appreciation of their own work* (Prensky, 2001). Prensky's and Tapscott's ideas have become very influential and several researchers have tried to support or disprove their thoughts with variable success (Bennett, Maton, Kervin, 2008).

Although the author of the presented study does not either support or disprove the idea of different approach to "digital natives" education, he thinks that through monitoring the educational reality and the opinions of the people involved, an appropriate space for developing professional discussion of this phenomenon can be created. This issue goes hand in hand with "new" role of the teacher in the educational process based on thorough usage of modern didactic tools in form of interactive boards or multimedia presentations. As the presented research showed, not all teachers are prepared for their new role and they are not able to fully use the possibility modern didactic tools offers. In this respect, it is stunning that more than 64.9 % of primary schools teachers have come across these tools but only 20.1 % is capable of creating the needed multimedia presentations without which the usage of interactive board in tuition makes no sense (Klement et al, 2011b). In contrast with this fact there are high expectations from school headmasters, where more than 92 % of them expect their teachers-to-be to manage and commonly use these technologies in practice.

Conclusions

All target groups of the carried out research showed real interest in the exploration of tuition supported by modern didactic tools and the usage of multimedia presentations.

The extent to which school teachers as well as directors are interested in the matter is pleasing and will probably result in the training quality enhancement in the future. The investigations carried out so far show that primary school pupils share this interest, too and to no lesser extent (Klement et al. 2011b). Thus there exist mutual expectations on both sides, i.e. in both groups participating in the educational process. These expectations should both be met and made use of as they have a potential to bring about major changes to the educational process.

A possible way to achieve the desired shift towards more effective and more fun teaching is a targeted training of current and future teachers in the field of the use of modern didactic tools and the creation of digital presentations so that the concept of teaching corresponds to the interests and preference of their pupils.

In such a rapidly developing field like this one we cannot keep our distance necessary for "evaluating carefully and impartially", which is necessary for supported professional discussion. As a result, we perceive the above mentioned facts as an impulse to develop further discussions and as a stimulus to responsible and balanced attitude towards the needs of primary schools both sub stages' pupils. Even if it is possible that they are not in fact the digital natives and the current issues connected with school systems and the following results originate elsewhere, we cannot disprove this fact. Thus it is necessary to constantly watch this field, continuously evaluate attitudes of participants of such tuition and we should try to look for the best ways to come up to their expectations.

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UNIVERSITY STUDENTS' INFORMATION SOURCES OF EDUCATION FOR SUSTAINABLE DEVELOPMENT ISSUES AND THEIR PERCEPTIONS OF ENVIRONMENTAL PROBLEMS

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Abstract

Mass media consumption has expanded from traditional mass media – television broadcasting, newspapers, radio - into new media, such as the Internet. Information about environmental issues such as global warming, water and air pollution and other environmental problems, comes mainly from the media. In Finland nowadays the Internet is generally the most important source of news for young people. The media has also been used in a variety of ways relating to education for sustainable development. In the survey, education for sustainable development, students' opinions were asked on 73 items concerning different dimensions of education for sustainable development. This study focuses on two of these items: how university students from different disciplines get information about education for sustainable development issues and which environmental problems they perceive as being the most important. It was found that although students get information about education for sustainable development issues mainly from television and newspapers almost an equal amount comes from the Internet, and lectures are the fourth source of information. Students perceived climate change and the lack of clean water as being the most important environmental problems, the second was the decrease in biodiversity and the least important, malaria. Those students whose information source was mainly television did not perceive biodiversity as being that important environmental problem.

Key words: *education for sustainable development, environmental problems, environmental information sources*.

Introduction

Education for Sustainable Development

The idea of Education for Sustainable Development (ESD) has been used since the end of the 20th century together to meet concern about environmental education. ESD allows learners to acquire the skills, capacities, values and knowledge required to ensure sustainable development. It is education at all levels and in all social contexts; family, school, workplace and community. It fosters responsible citizens and promotes democracy by allowing individuals and communities to enjoy their rights and fulfill their responsibilities. Further, it is education for life-long learning and fosters the balanced development of the individual. (UNESCO, 2005) ESD replaces problem orientation which is associated with environmental education (EE) and shifts the focus to the inclusion of social issues and economic development (see e.g. Kopnina, 2011). According to Hesselink, van Kempen and Wals (2000), the relationship between EE and ESD can be understood in several ways: EE is part of ESD, ESD is a part of EE, EE and ESD partially overlap, or ESD is a stage in the evolution of EE. The EE/ESD pedagogies often overlap in environmental education literature, including student-centered, minds on and hands-on learning, as well as active participation (Eilam and Trop, 2010). EE/ESD comprises of several models which in general consist of three or four dimensions. For example, Palmer (1998) highlights education about, in and for the environment. In models which are based on the ideas of Hungerford and Volk (1990), environmental education most often consists of four dimensions: sensitivity, knowledge, action, and participation (Jeronen, Jeronen & Raustia, 2009; Käpylä, 1995). The final phase of environmental education is towards participation in society and in its broadest sense, participation at the global level.

Education for Sustainable Development Issues in Higher Education

ESD issues have, to some extent, been studied at the higher education level. According to Reid and Petocz (2006), many university teachers in varying disciplines show an awareness of sustainability playing some role in their teaching, but some of them view from a limiting perspective. While limiting conceptions of teaching result in limiting approaches to sustainability, expansive or holistic conceptions lead to a broader approach to the issue. For the majority of the teachers, sustainability and teaching were separate entities; also the language associated with sustainability, for example EE, SD, ESD, did not belong to the vocabulary of most academics' (Reid & Petocz, 2006). Elshof (2005) reported that teachers of technology considered sustainability issues which related to social justice and equity to be less important. On the personal level, teachers considered population growth, human rights, international trade and pollution to be the most significant components of sustainable development, while biodiversity, international trade, unjustified economic subsides and global warming, were the least important. Salīte, Mičule, Kravale, Iliško, and Stakle (2007) found that teacher students consider environmental problems, pollution, the use of resources and disasters to be important, as well as other problems indirectly related to this aspect. In this same study, environmental pollution was viewed by the students as toxic pollution (gas, oil, and chemical escapes), nature pollution, shortage of dumping sites and an increase in the number of factories. The types of pollution identified were mostly related to peoples's activity and animal waste while in the characterization of environmental pollution, the effects of climate changes (depletion of ozonosphere) and rise of temperature were also a cause for concern. Problems related to the use of natural resources and disasters were named less frequently than pollution problems.

Svetina, Istenič-Starčič, Juvančič, Novljan, Šubic-Kovač, and Zupančič (2011) have assessed younger college students´ understanding of sustainability. They found that students in urban settings had higher sustainability scores than those in non-urban settings. Sustainability issues became more interesting with increasing age particularly in adolescents living in urban settings and it was also noted that girls tended to express a higher degree of appreciation toward sustainable solutions than boys.

Oztas and Kalipci (2009) revealed in their study that teacher candidates considered global warming to be main issue concerning environmental problems the second being climate change; other important issues were demographic effects, greenhouse effects, shanty housing and urban sprawl. A considerable number of teacher students were aware of the main environmental pollutants and their risk factors: deforestations, diminishing drinking water sources, water pollution, soil pollution, air pollution and acid rains. Teacher candidates were less aware of decreasing of biodiversity and noise pollution. According to Oztas and Kalipci (2009) the major source for information on environmental education was radio and television (40%). Scientific books and journals were not seen as providing useful resources for environmental education.

Media as a Source of Environmental Issues

There has been a significant expansion in consumption from the traditional mass media – television broadcasting, newspapers, radio - into the consumption of new media such as the Internet and mobile phone communications. These signal changes in how people access and interact with information (Boykoff, 2009). Nowadays, Finns follow news mainly via four media: television, printed newspapers, radio, and the Internet. In 2010, the role of the Internet generally increased at the same phase as in previous years. According to the latest report on the use of communication services in Finland (FICORA 2011), the Internet is the most important source of news for young people. Although television still has a strong traditional standing in Finland, still being the most important way for all age groups (15 to 65) to follow its audiovisual content, the 20-24 years olds use television less than others. Internet, instead of television, is the most important device for the men under 25, concerning both programs on the whole as well as videoclips. Online viewing is particularly popular among members of the youngest age groups; for Finns under 35, Internet is the most followed news channel, but for those over 35 television news is the most popular.

Much of what most people hear about issues such as global warming, decreasing biodiversity, lack of clean water, erosion, desertification, over-grazing, malaria and environmental threats, is likely to come from the media (Shanahan, Morgan, & Stenbjerre, 1997; Asunta, 2003; Lee, 2008; Boykoff, 2009). According to Asunta (2003), the main environmental information sources of 12 to 15 year-old pupils in Finland, were television and radio; next in priority were the science teacher, newspapers and magazines, parents, other pupils, and the Internet and after these sources came movies, friends, conservation organization, Greenpeace or WWF and municipalities and consumer organizations.

Lee (2008) also states that although, television was college students' major source of information on environmental news related to local, national and global environmental problems the second was the Internet. Daily newspapers and governmental sources were those least used. Lacy, Riffe, and Varouhakis (2007) state that different media are used as an information source at different geographic levels and conclude that many people use two or more sources to find environmental news. Growth of the Internet may well be reshaping patterns of media use. The more local the geographic emphasis is of the news, the greater the number of people who do not access any environmental information and less diverse is the access of those who do. The Internet was often used in conjunction with other media, and most often used was the television news and newspapers. At the global level, respondents who used the Internet were most likely to use television news as an additional environmental news source. (see Lacy et al., 2007)

Later on, Riffe and Reimold (2008) especially refer to young people and the internet´s increasing potential for them as an environmental news source both on a national and international scale. Internet was frequently cited as the most useful environmental news source for the youngest respondents (18-24 year-olds). However, based on their study, even in the Internet age, they also agree about the significance of newspapers for delivering more localized environmental news and information. Television was still the primary news source for young people. Conversely, Oztas and Kalipci (2009) report that radio and television, news-magazines, Internet, scientific books, and lectures, in this order were teacher candidates' major source about environmental risk factors.

Watching documentary films enhances students' environmental sensitivity (Bahk, 2010; Barbas, Paraskevopoulos, & Stamou, 2009). Barbas et al. (2009) conclude that in the development of environmental knowledge and feelings the non-verbal, less conventional documentary is more effective, but in the change in attitudes and beliefs, the verbal, 'traditional' one is equally effective. According to Shanahan, Morgan and Stenbjerre (1997) there is essentially no bivariate relationship between television viewing and the perception of specific threats to the environment such as industrial air pollution or the greenhouse effect. A theoretically coherent view would be that television messages do specifically cultivate environmental fear; television in general uses fear, doomsaying, and sensationalism to generate attention. Maybe the best known film concerning environmental issues is "An Inconvenient Truth" and several countries have even proposed using the film as an educational tool in school classrooms (Nolan, 2010). Watching this film increases knowledge about the causes of global warming, concern for the environment and willingness to reduce greenhouse gases. However willingness to take action immediately after watching the movie does not necessary result in action later on (Nolan, 2010).

In this study, university students' perceptions on environmental problems and their information sources on environmental issues will be clarified. The study focuses on the research questions:

- Which issues do university students perceive as being the most important environmental problems?
- Which information sources do university students use when seeking knowledge on education for sustainable development?
- What kind of relationship is there between information sources and perceived environmental problems?

Methodology of Research

General Background of Research

This study is a quantitative survey. The participants in the study comprised of five hundred and twenty three (n=523) university students from one quite typical university. The data was collected through a questionnaire which consisted of five parts and included a total of 73 items. Demographic information was asked in the beginning of the questionnaire namely: gender, age, how many years of study, the students´ major and minor subjects and where the participants came from.

Sample of Research

The students were from different faculties and majored in different subjects (Table 1). There were 73% female students and 27% male students, 10 students did not mark the gender. Table 2 presents the participants' study year.

Table 1. Participants of the study and their major subject (N/%) (Due to missing data n=513).

Major subject	Gender		
	Male	Female	Total
Arts, Social Sciences	23/27	61/73	84/16
Education	72/22	249/78	321/63
Mathematics, Sciences	42/39	66/61	108/21
Total	137/27	376/73	513/100

Table 2. Participants' study years (N/%).

Major subject	Study year			
	1st year	2nd year	3rd year	4th or more years
Arts, Social Sciences	41/49	9/11	7/8	27/32
Education	185/57	51/16	74/23	15/5
Mathematics, Sciences	75/69	16/15	5/5	13/12
Total	301/58	76/15	86/17	55/11

Instrument and Procedures

The questionnaire was developed based on the four dimensions of ESD. In this article the findings related to two of the questions are reported. Firstly, it was asked from where information about education for sustainable development has been obtained? The alternatives given were television, lectures, friends, magazines, newspapers and the Internet and the possibility to write some other source was also given. Secondly, it was asked what is the most serious global environmental problem. Students were required to rank the following problems in order so that the most important is number 1, the second important 2 and so on. The environmental problems given were a decrease in biodiversity, desertification, climate change, lack of clean water, erosion, over grading and malaria as well as the possibility to add some other environmental problem. Data collection took place in 2009-2011. It took 15 to 30 minutes for students to fill in a paper version of the questionnaire and they worked independently.

Data Analysis

Here the analysis is focused on ranking of the most important environmental problem and naming the information sources which university students used. Due to the nature of the variables descriptive statistics, frequencies, cross tabulation and the chi-square test of differences were used, also association between some dichotomous variables was analysed with phi correlation.

Results of Research

The university students perceived climate change as being the most serious environmental problem, 45% of the students perceived it as being the most serious (Table 3). The second most serious environmental problem was the lack of clean water (34%) and in third place the decrease in biodiversity (15%). 31% of the students perceived the decrease in biodiversity as being the second serious environmental problem while desertification was mainly considered as the fourthly most serious. Over grazing was mainly considered to be a less serious environmental problem and malaria was not seen as a serious environmental problem at all, 81% of the students ranking it in fifth place or considering it to be less serious.

Table 3. Environmental problems as perceived by university students in the order from the most serious (N/%).

Environmental problem	1st most serious	2.	3.	4.	5th or less serious	Mean
Climate change	234/45	140/27	80/15	33/6	36/7	2.1
Lack of clean water	177/34	142/27	112/21	41/8	51/10	2.4
Decrease in biodiversity	77/15	161/31	151/29	67/13	67/13	2.8
Desertification	7/1	27/5	71/14	138/26	280/54	4.6
Erosion	3/0.6	12/2	46/9	115/22	347/66	5.0
Over-grazing	1/0.2	11/2	23/4	68/13	420/80	5.6
Malaria	2/0.4	19/4	28/5	53/10	421/81	6.0

Students’ sources of information concerning education for sustainable development issues, are shown in Table 4. University students selected television and newspapers (67%) as the most frequent sources of information on issues concerning education for sustainable development although, they also selected the Internet (60%) nearly as often as television and newspapers. Lectures were also selected as important sources for information about education for sustainable development (51%). It has to be noted that 479 out of 523 students answered the question concerning the information sources, probably due to the fact that the question was in the last part of the four-sided questionnaire. The students had the possibility to select as many information sources as they wanted.

Table 4. Sources of information on issues concerning education for sustainable development.

Source	Count	Percent of Cases (N=479)
Television	322	67
Newspapers	322	67
Internet	289	60
Lectures	246	51
Magazines	190	40
Friends	155	32

Students who selected getting information about education for sustainable development from friends, also selected magazines as an important source for information on the issue ($r = 0.31$, $p<0.001$) and they also selected Internet ($r = 0.25$, $p<0.001$) as an information source to some extent. Students who selected television as an important information source, selected also newspapers ($r = 0.34$, $p<0.001$) to be an important information source but also Internet ($r = 0.30$, $p<0.001$). Lectures as an information source could not be associated together with any other information source other than loosely with friends ($r = 0.14$, $p=0.002$) as information source.

Decreasing biodiversity was most often ranked as a second or third most serious environmental problem. Cross tabulation of biodiversity’s seriousness with television as the information source among those students who selected lectures as a source of information as well is shown in Table 5. Those students, who did not select lectures as their information source for environmental issues, but selected ‘yes’ to television, rank biodiversity as a less important environmental problem e.g. biodiversity second most serious: ‘yes’ to television 27% , ‘no’ to television 40%, the difference between rankings is statistically significant (χ^2=12.43, df=4, p=0.014). For students who selected lectures as an information source, there is no such difference. When ranking the decreasing biodiversity as a serious environmental problem, the same effect is not found between lectures and the Internet nor between lectures and newspapers.

Table 5. The seriousness ranked by students of decreasing biodiversity as an environmental problem cross tabulated with television as information source among groups who mention lectures or do not.

Lectures and seriousness of decreasing biodiversity problem				Television		Total
				No	Yes	
No	Biodiversity (when No lectures, then difference)	1st most serious	Count (%)	16 (15)	14 (8)	30(11)
			Adjusted Residual	1.7	-1.7	
		2.	Count (%)	**43 (40)**	46(27)	89(32)
			Adjusted Residual	**2.2**	-2.2	
		3.	Count (%)	22(20)	**61(36)**	83 (30)
			Adjusted Residual	-2.8	**2.8**	
		4.	Count (%)	11(10)	25(15)	36(13)
			Adjusted Residual	-1.1	1.1	
		5th or less serious	Count (%)	16(15)	23(14)	39(14)
			Adjusted Residual	0.3	-0.3	
	Total		Count	108	169	277
Yes	Biodiversity	1st most serious	Count (%)	17(18)	29(19)	46(19)
		2.	Count (%)	29(32)	43(28)	72 (29)
		3.	Count (%)	25(27)	43(28)	68(28)
		4.	Count (%)	9(10)	22(14)	31(13)
		5th or less serious	Count (%)	12(13)	16(10)	28(11)
	Total		Count	92	153	245

When taking gender into account, we found that female students rank climate change as the most serious environmental problem more often than the male students (Table 6). 49% of the female students and 34% of the male students ranked climate change as the most serious environmental problem; the difference between rankings is statistically significant (χ^2=15.35, df=4, p=0.004). 37% of men ranked the lack of clean water as the most serious environmental problem.

Table 6. Difference between gender concerning the seriousness of climate change as an environmental problem.

Gender		Climate change					Total
		1st the most serious	2	3	4	5th or less serious	
Male	Count	**47**	36	28	13	14	138
	Percent	**34**	26	20	9	10	100
	Adjusted Residual	**-3.0**	-0.3	1.9	1.7	2.2	
Female	Count	**184**	104	51	20	18	377
	Percent	**49**	28	14	5	5	100
	Adjusted Residual	**3.0**	0.3	-1.9	-1.7	-2.2	
Total	Count	231	140	79	33	32	515
	Percent	45	27	15	6	6	100

When comparing students' rankings about the seriousness of environmental problems, it was found that, even gender controlled, educational science students more often than other students ranked the lack of clean water as the most serious environmental problem (χ^2=16.86, df=8, p=0.032, Table 7).

Table 7. The seriousness of the lack of clean water as ranked by students in different disciplines.

Major subject		Lack of clean water					Total
		1st the most serious	2	3	4	5th or less serious	
Arts, Social sciences	Count	21	24	23	11	6	85
	Percent	25	28	27	13	7	100
	Adjusted Residual	-1.9	0.3	1.4	1.9	-0.9	
Education	Count	**125**	84	68	20	28	325
	Percent	**38**	26	21	6	9	100
	Adjusted Residual	**2.9**	-0.8	-0.3	-1.9	-1.2	
Mathematics, Sciences	Count	30	33	20	10	17	110
	Percent	27	30	18	9	15	100
	Adjusted Residual	-1.6	0.8	-0.9	0.5	2.2	
Total	Count	176	141	111	41	51	520
	Percent	34	27	21	8	10	100

Students were also asked if they think that they really understand what is the meaning of 'education for sustainable development'. 85% of the students responded that they did. Thus, it is assumed that the students were capable of responding to the question 'from where do you get information about education for sustainable development'. The relationship between EE and ESD was also asked. 60% of the students were of the opinion that ESD was the same as EE, and 40 % thought it was not.

Discussion

According to the university students, in their opinion climate change is the most serious environmental problem, second is the decreasing biodiversity and third the lack of clean water. This finding partly disagrees with that of Elshof (2005) in which technology teachers perceived biodiversity and global warming as being the least important sustainability issue. Teacher students in the study of Salïte et al. (2007), also considered the serious effects of climate changes, but other issues were held to be more serious problems, among them pollution in particular. The difference between the results in these studies is probably due to the methods used in the research. In this study, only global issues were given to the students whereas in the other previous studies pollution is often viewed from the local viewpoint. Other reasons for the differences in results might be due to cultural differences and the actual state of the environment in the countries where these studies have been carried out. The findings in this study concerning perceived environmental problems are similar however, to those found by Oztas and Kalipci (2009). In their study teacher candidates' considered the most important issue in environmental problems as being global warming, while the second was climate change; even though in this Turkish case the culture and state of the environment are also probably different. In comparison students from arts, social sciences, mathematics or natural sciences educational science students more often ranked the lack of clean water as being the most serious environmental problem. Educational sciences student will become future primary school teachers. Because water has a significant role in primary school science this has maybe influenced students' perception about environmental problems.

Among the university students, the main information sources for education for sustainable development were found to be firstly television, secondly newspaper and thirdly Internet, all in relatively equal measures. This finding is in accordance with the most of the studies carried out in the 20th century, see for example Asunta (2003), Lee (2008) and Boykoff (2009). Television has long been an important source for environmental information but the role of the Internet has also generally increased in the 20th century (cf. FICORA, 2010). Concerning the global problems such as those in this study, both the Internet and television news have been used together as an environmental news source (see Lacy et al., 2007). The role of these sources together is highlighted also in this study. The findings relating to the important sources of environmental information are in accordance with those of Riffe and Reimold (2008). They refer to an increasing potential role for the Internet to serve as an environmental news source, especially among young people and for environmental news on a national and international scale. The role of information sources in this study were also similar to the findings of Oztas and Kalipci (2009) who report that teacher candidates' major source of information about environmental risk factors were, in this order, radio and television, news-magazines, Internet, scientific books, and lectures. However, in this study the role of the Internet was found to be more important compared with the radio and magazines which were less important.

More often than male students, female students regarded climate change as the most serious environmental problem being in line with Svetina et al.'s (2011) findings about the difference between gender concerning the appreciation of sustainability. There were also differences in the students' opinions regarding the perceived environmental problem. Those, who did not select lectures as their information source for environmental issues, but received information from television, perceived the decrease in biodiversity as less important environmental problem. The same effect was not found concerning students who selected lectures as an information source; there was no evidence of the same difference between watching television and the perception of the decrease in biodiversity as being less serious environmental problem nor between lectures and the Internet or lectures and newspapers. These findings are partially in accordance with the statement of Shanahan et al. (1997) that there is essentially no bivariate relationship between television viewing and perception of specific threats to the environment. Namely the combination of lectures- television as information sources, did influence students' perception of the decrease in biodiversity as a serious environmental problem. This study did not ask about which form of television program had been the information source (c.f. Barbas et al., 2009). The role of television as an information source may be similar to that found by Nolan (2010) concerning the film "An Inconvenient Truth". Watching the film increases knowledge about the causes of global warming, however willingness to take action immediately after watching the movie does not necessary translate into later action.

Conclusions

The high percentage in the understanding EE/ESD concept, can be explained by the fact that the largest group of students comprised of educational science students and ESD is included in the curriculum in educational science, particularly in teacher education. Conversely, the arts and social science students were studying multidisciplinary environmental science studies and therefore had knowledge about the SD issues. Yet, only half of the students do mention lectures as information source, even though sustainable development is explicitly mentioned, in the strategy of the university in question, to be taken into account in all activities. Only one third mention friends as information source, this may indicate that the issue is neither a topic of discussion during the studies, nor a matter of student-centered, minds on and hands-on learning, or active participation learning with shared negotiations of meanings.

The university students ranked climate change as the most serious environmental problem, the second was the decrease in biodiversity and the third the lack of clean water. The Finnish media has drawn both international and national attention to climate change, lack of clean water and decrease in biodiversity which obviously have influenced students' perceptions. Those who brought television to the fore as an information source did not rank equally the decrease in biodiversity as a serious environmental problem. This may indicate that television is most often watched without any particular educational purpose or that television underestimates the decreasing biodiversity. Is it possible that desertification, erosion, over grazing and malaria are perceived as less serious problems by students just because they are not concrete, immediate, local environmental problems in Finland?

Knowledge about the environment and environmental problems is often based on beliefs that arise from nonselective screening of information. It is possible to encourage university students' critical thinking through the education for sustainable development by considering how media contribute to creating and spreading knowledge of sustainable development and environmental problems in general. The quality of information sources is important; how they make an active contribution to tackling the complexity of environmental problems and considering the ecological, social, economical and cultural aspect of sustainable development. Environmental awareness and discussion of global and local environmental problems, needs that there is enough scaffolding when considering the causes, effects and solutions as well as a sense of responsibility for taking actions.

The students considered the Internet to be a very important source of sustainable development issues, nearly as important as television and newspapers, therefore there is a clear need to develop pedagogical approaches for the use of the Internet in ESD education. Practices to be in accordance with the contemporary pedagogical theories need to be developed. Furthermore scaffolding is needed in the learning of complex environmental issues e.g. in order for the use of Internet to be relevant. Practices should also be examined to get reliable information about the usefulness and significance of the Internet's use for learning and its proper ways of scaffolding in education. It is also important, in further study, to investigate university students' perceptions about the quality of information sources and their preferences concerning reliable sources of scientific information on the environment.

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PERCEPTION OF DISTRICT QUALITY ASSURANCE AND STANDARDS OFFICERS ON LEADERSHIP STYLES OF DISTRICT EDUCATION OFFICERS IN KENYA

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Abstract

Leadership in the public sector is a key variable that is expected to propel the achievement of Vision 2030. This is indeed crucial in the Education Sector which forms the basis of the social pillar of Vision 2030. The DEO and the DQASO are line managers with a primary role in policy implementation in the Ministry of Education. The purpose of the study was to investigate the perception of District Quality Assurance and Standards Officers towards the leadership styles of District Education Officers. The study established the characteristics of DQASOs, the leadership styles of the DEOs and identified the perceived challenges of DQASOs in Kenya. The study was guided by the Learning Organization theory of Peter Senge 1990 which emphasizes the need for involvement in decision making of those who carry out decisions for greater understanding and commitment.

Descriptive survey design was used and the study sample included a total of 29(10%) District Quality Assurance and Standards Officers (DQASOs) drawn from a population of 287 DQASOs from the 287 Districts in Kenya. The researchers made use of DQASOs who were attending the tenth 2011 Senior Management Course drawn from across Kenya as respondents. A questionnaire for DQASOs was designed to facilitate data collection. The study established that autocratic leadership style was dominant in most District Education offices with little consultation, teamwork and communication since the DEOs unilaterally made decisions and rarely accepted advice and criticism from members of staff. The DEOs' personal traits greatly influenced their leadership styles. The DEOs were perceived to be unsupportive and rarely provided a conducive environment that motivated the staff. Most DEOs were not committed to supporting quality assurance and standards programmes in most Districts. The study recommended that the DEOs should integrate and employ varied leadership styles in management of education and delink their personal traits from office management. Clear communication channels between DEOs and staff should be established involve senior staff members in decision making. The DEOs should support Quality Assurance and Standards Programs in the Districts and provide a conducive environment for staff motivation.

Key words: *leadership styles, perception, quality assurance.*

Introduction

It has been a long held belief that the major factor which distinguishes successful organizations from their less successful counterparts is the presence of dynamic and effective leadership (Yuki, 2006). Though the literature suggests that an organization's strategy is not always driven by senior managers, it is certainly the case that they are held responsible for success or failure. They are the people who are formally charged with taking decisions, directing others and creating a framework of rules, systems and expectations within which the organization operates. Given the importance of leadership, therefore it is surprising to find that it is such an elusive concept. One of the weaknesses of the leadership literature is that it tends to concentrate on the traits of individual managers and their relations with subordinates. Yet as Burnes, (1991) and Hales (1986) argued, a manager's effectiveness may be determined as much by the nature of the organization in which he or she operates as by the qualities of the individual manager.

Leadership is a process by which a person influences others to accomplish an objective and directs the organization in a way that makes it more cohesive and coherent, Okumbe, (2008). Leaders carry out this process by applying their leadership knowledge and skills. However, we know that we have traits that can influence our actions. This is called *Trait Leadership* (Okumbe, 2008) in that it was once common to believe that leaders were born rather than made. While leadership is learned, the skills and knowledge processed by the leader can be influenced by his or hers attributes or traits, such as beliefs, values, ethics, and character. Knowledge and skills contribute directly to the process of leadership, while the other attributes give the leader certain characteristics that make him or her unique.

Leadership and Management

The DEO's management leadership style has an effect on the quality of service delivery. A participative leader, rather than taking autocratic decisions, seeks to involve other people in the process, possibly including subordinates, peers, superiors and other stakeholders. Weber (1987) acknowledges the fact that, leadership should be shared at all cost to reduce animosity. He contends that, shared leadership responsibilities with the subordinates promotes better service. Often, however, as it is within the managers' whom to give or deny control to his or her subordinates, most participative activity is within the immediate team. The question of how much influence others are given thus may vary on the manager's preferences and beliefs. One dimension of this has to do with control and one's perception of how much control one should give to people. The laissez faire style implies low control, the autocratic style high control and the participative lies somewhere in between. Leadership increases the effectiveness and proficiency of management and sustainable performance (Reed, 2005) and effective management of resources. Organizations and environment have changed rapidly over the past years and as a result a new type of leadership that is less and more democratic is needed in order to ensure survival of the organization (Johnson, 1995). Maicibi, (2005) observes that proper leadership style leads to effective performance in organizations/institutions. Leadership effectiveness is most conveniently quantified by organizational outcomes (Johnson, 1995). The focus is to offer the best services to the customer who currently is the focus of any meaningful management. The office of the DEO has a vision and the DEO alone cannot achieve this vision without calling for the co-workers participation.Studies done do indicate that co-workers and stakeholders involvement in decision- making yield salutary results (Doyle & Wells 1996; Wong, 2003). It is also shown that employee satisfaction, motivation, morale and self-esteem are positively affected by involvement in decision making and implementation (Doyle &Wells, 1996). Wong (2003) argues that employee commitment and loyalty are fostered by collaborative management practice. According to Gamage (2007) and Owens (1998) collaborative management tends to create a sense of ownership of change initiatives and eventually extend stronger support to realize the goals of such efforts. Further, such leadership results to better decisions and greater efficiency since issues are discussed extensively via open communication among people having varying viewpoints involved in participative set-ups (Gamage, 2007; Owens, 1998). Lienhart and Willet (2002) argue that by implementing participative management practices co-workers are given a sense of control over their own working lives, power inequalities are balanced and additional resources become available to the organization.

Therefore participatory management leadership is an important aspect that cannot be brushed away especially in this era of technological advancement and emphasis in the attainment of Millennium Development Goals (MDGs). Kenya like other countries is in the race of attaining MDGs alongside the Vision 2030 where it is expected to be an industrialized nation. Therefore management of education is an important aspect towards attainment of the set national and international obligations. However, there has been criticism in the way education is managed in Kenya. This may hinder the achievement of the most spoken out educational MDGs and the set vision 2030.In fostering trust, certain aspects of participatory practices have been found essential. According to Bryk and Schneider (2002) these practices are open communication and supportive and collegial behavior of the leader. The DEO's office is composed of different departments manned by different personnel who provide abundant opportunities for the participatory education administration, leadership and management.

Lewin et al., (1939) conducted one of the first and most famous studies of leadership styles. The study in cooperated three styles of leadership where individuals were put into groups within this leadership styles. In the democratic style of leadership, group decisions were by majority vote, equal participation was encouraged and criticism and punishment were minimal. In the autocratic leadership style, all decisions were made by the leader and participants were required to follow prescribed procedures under strict discipline. Lastly, in laissez-faire leadership, the actual leadership activity of the group leader was kept at a minimum, allowing the participants to work and play essentially without supervision. The results of the study show that the groups with democratic style of leadership were the most satisfied and functional in the most orderly and positive manner. The results also show that the number and degree of aggressive acts were greatest in the autocratically led groups. According to Okumbe, (2008) a combination of personality traits and leader behavior gives leadership style which contributes significantly to the prediction of performance. He holds the view that leadership training of educational managers should enable them to acquire conceptual, human relations and technical skills which are essential in organizational behavior. In leadership training, educational leaders are made through the acquisition of well set out management skills. This enables them to develop leadership talents that will facilitate effectiveness in school management in terms of general management skills, human relations, problem solving and decision making.

Goldring (2005) and Anfara et al. (2008) affirms that a good leader has a revitalized vision and a renewed sense of the group's purpose; strengthens morale among employees; infuses new ideas and recalibrates outdated structures and processes; and facilitates more authentic, dynamic, and effective communication. Various scholars have argued for or against collaborative or participative leadership in management of education. One school of thought stresses on collaborative leadership because it enhances organizational effectiveness (Anfara et al., 2008). A second school rests its case for participation on democratic principles. In this approach to leadership, authority and influence are potentially available potentially to any legitimate stakeholder in the school, based on their expert knowledge, their democratic right to choose, and their critical role in implementing decisions (Anfara et al, 2008). Research indicates that leadership has a strong relationship with the extent to which an organization has a clear mission and goals, the overall climate of the organization and the attitudes of the co-workers.

Leadership Dimensions

Job performance generally refers to behavior that is expected to contribute to organizational success (Campbell, 1990). Campbell identified a number of specific types of performance dimensions; leadership was one of the dimensions that he identified. There is no consistent, overall definition of leadership performance (Yuki, 2006). Many distinct conceptualizations are often lumped together under the umbrella of leadership performance, including outcomes such as leader effectiveness, leader advancement, and leader emergence (Kaiser et al., 2008).There are four major factors in leadership (U.S. Army, 1983): As a leader, one must have an honest understanding of who you are, what you know, and what you can do. It is the followers, not the leader or someone else who determines if the leader is successful. If they do not trust or lack confidence in their leader, then they will be uninspired. To be successful you have to convince your followers, not yourself or your superiors, that you are worthy of being followed.

Followers are different people who require different styles of leadership. For example, a new hire requires more supervision than an experienced employee. A person who lacks motivation requires a different approach than one with a high degree of motivation. You must know your people! The fundamental starting point is having a good understanding of human nature, such as needs, emotions, and motivation. You must come to know your employees' be, know, and do attributes. Communication is leading through two-way communication. Much of it is nonverbal. For instance, when you "set the example," that communicates to your people that you would not ask them to perform anything that you would not be willing to do. What and how you communicate either builds or harms the relationship between you and your employees.

Finally, all situations are different. What you do in one situation will not always work in another. You must use your judgment to decide the best course of action and the leadership style needed for each situation. For example, you may need to confront an employee for inappropriate behaviour, but if the confrontation is too late or too early, too harsh or too weak, then the results may prove ineffective. The situation normally has a greater effect on a leader's action than his or her traits. This is because while traits may have an impressive stability over a period of time, they have little consistency across situations (Mischel, 1968).

One of the more recent definitions of leadership comes from Werner Erhard, Michael C. Jensen, Steve Zaffron, and Kari Granger who describe leadership as "an exercise in language that results in the realization of a future that wasn't going to happen anyway, which future fulfills (or contributes to fulfilling) the concerns of the relevant parties…". This definition ensures that leadership is talking about the future and includes the fundamental concerns of the relevant parties. This differs from relating to the relevant parties as "followers" and calling up an image of a single leader with others following. Rather, a future that fulfills on the fundamental concerns of the relevant parties indicates the future that wasn't going to happen is not the "idea of the leader", but rather is what emerges from digging deep to find the underlying concerns of those who are impacted by the leadership.

Leaders emerge from within the structure of the informal organization. Their personal qualities, the demands of the situation, or a combination of these and other factors attract followers who accept their leadership within one or several overlay structures. Instead of the authority of position held by an appointed head or chief, the emergent leader wields influence or power. Influence is the ability of a person to gain co-operation from others by means of persuasion or control over rewards. Power is a stronger form of influence because it reflects a person's ability to enforce action through the control of a means of punishment.

Leadership Styles

Leadership style refers to a leader's behavior. It is the result of the philosophy, personality, and experience of the leader. Different situations call for different leadership styles. In an emergency when there is little time to converge on an agreement and where a designated authority has significantly more experience or expertise than the rest of the team, an autocratic leadership style may be most effective; however, in a highly motivated and aligned team with a homogeneous level of expertise, a more democratic or laissez-faire style may be more effective. The style adopted should be the one that most effectively achieves the objectives of the group while balancing the interests of its individual members. In the past, some researchers have argued that the actual influence of leaders on organizational outcomes is overrated and romanticized as a result of biased attributions about leaders (Meindl & Ehrlich, 1987). Despite these assertions, however, it is largely recognized and accepted that practitioners and researchers that leadership is important, and research supports the notion that leaders do contribute to key organizational outcomes (Day & Lord, 1988; Kaiser, Hogan, & Craig, 2008). To facilitate successful performance it is important to understand and accurately measure leadership performance.

Autocratic or authoritarian style is where decision-making powers are centralized in the leader, as with dictators. Leaders do not entertain any suggestions or initiatives from subordinates. The autocratic management has been successful as it provides strong motivation to the manager. It permits quick decision-making, as only one person decides for the whole group and keeps each decision to him/herself until he/she feels it needs to be shared with the rest of the group. In participative or democratic style**,** decision-making is favored by the group. Such a leader gives instructions after consulting the group. They can win the cooperation of their group and can motivate them effectively and positively. The decisions of the democratic leader are not unilateral as with the autocrat because they arise from consultation with the group members and participation by them. Laissez-faire or free rein style leader does not lead, but leaves the group entirely to itself. Such a leader allows maximum freedom to subordinates. They are given a free hand in deciding their own policies and methods.

In contrast to individual leadership, some organizations have adopted group leadership. In this situation, more than one person provides direction to the group as a whole. Some organizations have taken this approach in hopes of increasing creativity, reducing costs, or downsizing. Others may see the traditional leadership of a boss as costing too much in team performance. In some situations, the team members best able to handle any given phase of the project become the temporary leaders. Additionally, as each team member has the opportunity to experience the elevated level of empowerment, it energizes staff and feeds the cycle of success. Leaders who demonstrate persistence, tenacity, determination, and synergistic communication skills will bring out the same qualities in their groups. Good leaders use their own inner mentors to energize their team and organizations and lead a team to achieve success.

Context of the Study

The study was based on the office of the District Education Officer (DEO), who is the overall supervisor of the Ministry of Education at the District level. He/She coordinates all education activities in the district, Teacher management functions, AIE holder, and custodian of education policy in the district. The District Quality Assurance and Standards Officer (DQASO), is in-charge of Standards Assessment of all Educational Institutions and assuring quality and educational standards in the District. The DQASO’s activities are largely facilitated by the DEO who has the Authority to Incur Expenditure (AIE holder) and control all other resources in the District. The two offices are expected to work harmoniously for effective service delivery.
Organizational structure of the DEO’s Office

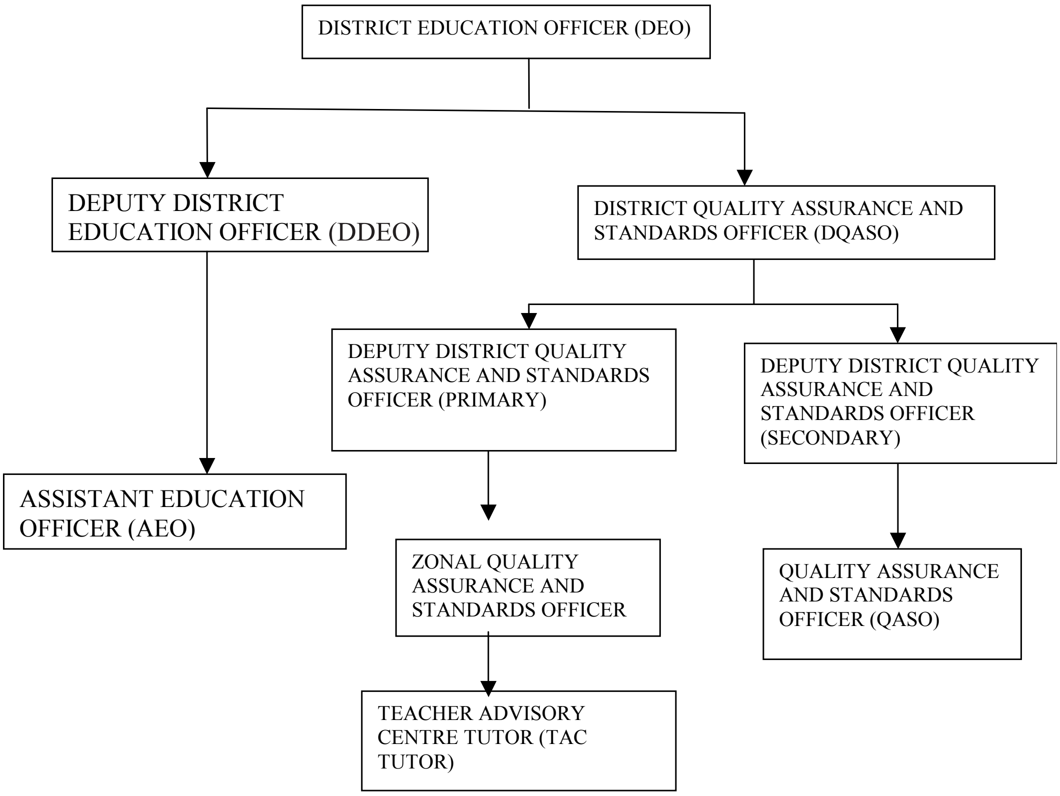
DISTRICT EDUCATION OFFICER (DEO)
DEPUTY DISTRICT EDUCATION OFFICER (DDEO)
DISTRICT QUALITY ASSURANCE AND STANDARDS OFFICER (DQASO)
DEPUTY DISTRICT QUALITY ASSURANCE AND STANDARDS OFFICER (PRIMARY)
DEPUTY DISTRICT QUALITY ASSURANCE AND STANDARDS OFFICER (SECONDARY)
ASSISTANT EDUCATION OFFICER (AEO)
ZONAL QUALITY ASSURANCE AND STANDARDS OFFICER
QUALITY ASSURANCE AND STANDARDS OFFICER (QASO)
TEACHER ADVISORY CENTRE TUTOR (TAC TUTOR)

Figure 1: Organizational structure of the district education officer's office.

Problem Statement

District Education offices in Kenya continue to face pressure to attain set national and international goals among them the educational MDG's, the Kenya vision 2030 and ISO 9001:2008. Worldwide there is increasing efforts to improve management of education at all levels. Currently the emphasis is on customer satisfaction as reflected in the ISO 9001:2008. The permanent secretary, ministry of education signs a performance contract which is cascaded to the district level where most of the implementation of the targets is done. This requires leadership styles that will enable managers at the district level to achieve the set targets. There is perceived dissatisfaction among education managers on leadership styles exhibited by some of the managers at the district level. This may impact negatively on quality service delivery and attainment of set targets thus the need for the proposed study. It is therefore imperative to move forward with ascertained understanding of which management styles are practiced by district education officers in Kenya and to what extent their co-workers are involved in management of education at district level.

Research Objectives

The study was guided by the following objectives:

1. To establish the characteristics of District Quality Assurance and Standards Officers (DQASO) engaged in management of education at District level in Kenya.
2. To identify leadership styles of District Education Officers (DEO) in management of education in Districts in Kenya.

3. To establish the perception of District Quality Assurance and Standards Officers on leadership styles employed by the District Education Officers in management of education in Kenya.

Theoretical Framework

This study was based on the theory of learning organization as propounded by Peter Senge in 1990. The theory is based on the concept that organizations in this era of globalization need to enable people to continually expand their capacity to create the results they truly desire. This implies that learning organizations nurture new and expansive patterns of thinking where people are continuously learning to see the whole together. The theory asserts that involvement in decision-making improves the understanding of the issues involved by those who must carry out the decisions. Further when people make decisions together, the social commitment to one another is greater and thus increases their commitment to the decision. As social institutions it is increasingly important that the District Education Offices deliver the expectations of the community in terms of quality service delivery. This can be achieved based on the management leadership styles of District Education Officers (DEO).

Methodology of Research

The study adopted a descriptive survey research design. Surveys are used to systematically gather factual information necessary for decision-making. Cohen & Manion, (1980) assert that the intention of a survey research is to gather data at a particular point in time and use it to describe the nature of existing conditions. Orodho (2002) observes that descriptive survey is used in preliminary and exploratory studies to gather information, summarize, present and interpret for the purpose of clarification. The study was carried out in Kenya using respondents drawn from various District Education Offices who had turned up for Senior Management Course (SMC) during the month of December 2011 at the Government Training Institute- Matuga. The target population included all the 287 District Quality Assurance and Standards Officers. They had all been in the Ministry of Education for at least three years and given that they constituted part of the line managers who are key in policy implementation at District level. A sample of 29 DQASOs representing 10% of the total DQASOs in Kenya was selected. According to Mugenda and Mugenda (2003), the main factor considered in determining the sample size is the need to keep it manageable enough.

Questionnaires were used to collect data from the respondents. Borg and Gall, (1983) identified a questionnaire as a convenient tool especially where the sample size is large. The questionnaires were organized in three sections in order to capture data related to respondents' biodata, leadership styles and perceptions on various leadership styles. Closed-ended questions comprising of structured and likert-type questions was used. Piloting was done to test validity and reliability of the instruments on an identical sample but not including the group to be surveyed, to check if the questions were measuring what they were supposed to, the wording, the interpretation of the questions, and if the researcher was biased. It also revealed vague questions and anticipated analytical techniques appropriate. Feedback by the test responded helped in refining the testing instruments. Data was analyzed using descriptive statistics and tabulated and findings presented in frequency tables and percentages. Gay, (2003) observes that frequencies and percentages easily communicate the research findings to majority of readers.

Results of Research

1. Characteristics of DQASOs

The first objective was to establish the characteristics of District Quality Assurance and Standards Officers (DQASO) engaged in management of education at District level in Kenya. To address this objective data on gender, academic qualification and work experience was gathered and presented in table 1 below.

Table 1. Characteristics of DQASOs.

Gender			Qualification			Work Experience (Years)		
	Freq.	**%**	**Professional Qualification**	**Freq.**	**%**	**Range in years**	**Freq.**	**%**
Male	22	75.9	Diploma	5	17.2	0 - 2	10	34.5
Female	7	24.1	Degree	13	44.9	3 – 5	13	44.8
			M. Ed	11	37.9	6 - 8	1	3.5
						9 - 12	0	0
						Above 12	5	17.2
Total	29	100		29	100		29	100

This information was meant to ascertain the ability, reliability and eligibility of respondents to respond to items in the questionnaire and to draw background information that may impact on the variables of the study. The results indicated that majority of participants were male, i.e. 75.9 % .Only 24.1% ware female. Data on professional qualification revealed that majority of respondents had a first degree and postgraduate qualification at 13(44.9%) and 11(37.9%) respectively. Only 5(17.2%) had reached diploma level. They all had a working experience as DQASOs of 3 year and above. This indicated that they all had the capacity to hold their respective positions and were experienced and knowledgeable enough to adequately handle the challenges of their duties and responsibilities.

2. Leadership styles used by DEO's in management of education in Districts in Kenya

Participants were asked whether the DEO gave a free hand to officers to plan and carry out their daily activities with minimal supervision, 4(13.8%) disagreed and 20(69%) strongly disagreed. They were further asked to indicate whether officers were self directed and reported for duty and left at their own pleasure having satisfactorily completed their daily workload. A total 7(24.15%) and 15(51.75%) disagreed and strongly disagreed respectively. Regarding democratic leadership, a total of 12(41.4%) and 4(13.8%) respondents disagreed and strongly disagreed that DEOs emphasized power through people rather than power over people. On implementation of resolutions agreed on in staff meetings, 11(37.9%) and 9(31%) disagreed and strongly disagreed meaning that staff meeting resolutions were rarely supported nor implemented. Most of the respondents also indicated that the DEO rarely consulted subordinates to get their opinions on various issues. This was evident by 8(27.6%) and 15(51.75%) who disagreed and strongly disagreed respectively. A total of 12(41.4%) and 5(17.25%) disagreed and strongly disagreed respectively that the DEO encouraged use of teams to plan and implement strategies for improvement. This showed that teamwork was an elusive component in most District Education Offices.

The next set of questionnaire items captured elements of autocratic leadership. Respondents were asked to indicate whether the DEO unilaterally made decisions without consulting concerned officers. On this, 8(27.6%) and 14(48.3%) strongly agreed and agreed respectively. It was also noted that 9(31%) and 10(34.5%) strongly agreed and agreed respectively that the DEOs rarely accepted advice and criticism from members. The respondents were also of the opinion that the DEO tended to dictate the work methods and processes in the departments irrespective of the departmental work plans. This was evidenced by 10(34.5%) and 8(27.6%) who strongly agreed and agreed respectively. This revealed that autocratic leadership style was dominant in most District Education offices since the DEOs unilaterally made decisions and rarely accepted advice and criticism from members of staff. However, there was little room for other leadership approaches as earlier outlined. The findings on leadership styles of DEOs are presented in the table below.

Table 2. Leadership styles of DEOs.

S/No.	Leadership styles	Frequencies &percentages	Strongly Agree	Agree	Disagree	Strongly Disagree
1	The DEO gives a free hand to officers to plan and carry out their daily activities with minimal supervision.	Freq. %	2 6.9	3 10.35	4 13.8	20 69
2	Officers are self directed and report for duty and leave at their own pleasure having satisfactorily completed their daily workload.	Freq. %	2 6.9	5 17.25	7 24.15	15 51.75
3	DEO emphasizes power through people rather than power over people	Freq. %	5 17.5	8 27.6	12 41.4	4 13.8
4	Resolutions agreed on in the staff meetings /briefs are fully supported and implemented	Freq. %	3 10.35	6 20.7	11 37.95	9 31
5	The DEO widely consults subordinates and goes by the opinion of the majority	Freq. %	2 6.9	4 13.8	8 27.6	15 51.75
6	The DEO encourages use of teams to plan and implement strategies for improvement	Freq. %	3 10.35	9 31	12 41.4	5 17.25
7	The DEO unilaterally makes decisions and rarely consults concerned officers.	Freq. %	8 27.6	14 48.3	2 6.9	5 17.25
8	The DEO rarely accepts advice and criticism from members.	Freq. %	9 31	10 34.5	4 13.8	6 20.7
9	The DEO dictates the work methods and processes in departments.	Freq. %	10 34.5	8 27.6	5 17.25	6 20.7

3. Perception of the DQASOs on leadership styles employed by the DEOs in management of Education in Kenya

The perception of DQASOs on leadership styles of DEOs was captured through a set of items on the questionnaire. It was noted that most respondents disagreed with the fact that departments were fully functional and autonomous in decision making. A total of 10(34.5%) and 8(27.6%) disagreed and strongly disagreed respectively as compared to 2(6.9%) and 9(31.05%) who strongly agreed and agreed respectively. This meant that the DEO manipulated and determined decision making and activities in various departments and therefore there was no room for involvement of other staff members

On whether communication in various DEO's offices was open and fluid, the majority of respondents disagreed and strongly disagreed as indicated by 10(34.5%) and 8(27.6%) respondents respectively. Asked whether the DEO had created an environment that was safe, supportive and conducive to working, 7(24.15%) and 13(44.85%) disagreed and strongly disagreed respectively with a minority agreeing. This meant that the DEOs were perceived to be unsupportive and never provided a conducive and safe environment that motivated the staff. Majority of the respondents indicated that the DEO did not utilized the AIE budget to facilitate quality assurance and standards programmes in the District, 9(31.05%) and 10(34.5%) respondents disagreed and strongly disagreed respectively. No respondent strongly agreed with the statement thus a clear indicator that the DEOs were not committed to supporting quality assurance and standards programmes in most Districts. The study established that the DEO's personal traits greatly influenced their leadership styles. This was shown by 14(48.3%) and 9(31.05%) who strongly agreed and agreed respectively. Only 3(10.35%) disagreed with the same proportion strongly disagreeing. This meant that there was need to train the DEOs on prudent management approaches and principles as opposed to personal tendencies and traits.Findings on perception of the DQASOs on leadership styles employed by the DEOs in management of Education in Kenya are summarized in table 3.1 below.

Table 3. Perceptions of DQASOs on DEO'S leadership styles.

S/No.	Perceptions	Frequencies & percentages	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Departments are fully functional and autonomous in decision making	Freq. %	2 6.9	9 31.05	10 34.5	8 27.6
2	Communication in your office is open and fluid	Freq. %	5 17.25	6 20.7	10 34.5	8 27.6
3	The DEO has created an environment that is safe, supportive and conducive to working	Freq. %	3 10.35	6 20.7	7 24.15	13 44.85
4	The DEO utilizes the AIE budget to facilitate Quality Assurance and Standards programmes in the district	Freq. %	0 0	10 34.5	9 31.05	10 34.5
5	The DEO's personal traits greatly influenced their leadership styles	Freq. %	14 48.3	9 31.05	3 10.35	3 10.35

Discussions

The purpose of this study was to establish the perception of District Quality Assurance and Standards Officers on leadership styles of District Education Officers in Kenya. In addressing the research objective, the study revealed that there was low participation by female officers accounted for by the fact that there were fewer female officers in this cadre and the nature of the job limited them as many women prefer working close to their homes and families. There are varied reasons for this disparity in management. This may be attributed to the disproportional academic achievement of males and females where boys tend to outshine girls at primary and secondary school levels as evident in the national exams. This minimizes the female chances in higher training and by extension in the management of institutions. Another reason could be that females fear responsibilities due to the nature of their roles at home as mothers and where they could prefer to spend little time at work and more time at home. Lastly the disparity could be attributed to the biasness of the appointing authority. However, the female officers who participated formed a representative sample.

The established that Laizzes faire and democratic types of leadership styles were least practiced in most District Education offices. Resolutions made during staff meetings were rarely supported nor implemented. The DEO rarely consulted subordinates to get their opinion on various issues and teamwork was never embraced as a strategy for improvement. Doyle and Wells, (1996) retaliates that employee satisfaction, motivation, morale and self-esteem are positively affected by involvement in decision making and implementation. Autocratic leadership has been shown to be detrimental in attainment of institutional culture and collective responsibility hence creating disharmony, suspicion and mistrust. Democratic leadership style is probably the most popular leadership style in the 21st century management arena. It's a style that remains popular due to the positive reaction employees have towards it as observes Oate, (2010).

The study revealed major communication breakdown between the DEO and the staff in most education offices. Effective organizational communication is critical to actively engage employees, foster trust and respect, and promote productivity'. SHRM's 2008 job Satisfaction survey report noted that communication between employees and senior management is among the top five very important aspects of employee job satisfaction. From the findings above the study indicated clearly that resources are not utilization does not add value to the organization. Prince, (2005) observed that a leader needs to utilize resources to add value to the organization. Research shows that a leader's financial style has a greater effect on an organization's success or failure than other corporate or external factors. The finding of the study shows that personal traits had an influence on leadership styles of DEOs. Charan, (2007) noted that integrity and character were personal traits that can affect leadership. Weihrich &Koontz, (1994) reteriates that most of the leadership traits are patterns of behavior which may not have any relationship with the actual instances of leadership. However, Okumbe, (2008) advocates for a combination of personality traits and leader behavior which gives leadership style that contributes significantly to the prediction of performance. This implies that a blend of personal traits and leader's behavior can result to better performance in management.

Summary

The purpose of this study was to establish the perceptions of DQASOs on the leadership styles of DEOs in Kenya in management of Education. This was systematically carried out and data presented and analyzed accordingly. The summary of the findings are stated below:

1. The DQASOs had adequate work experience and academic qualifications to provide credible information required for the study.
2. Laizzes faire type of leadership style was least practiced in most District Education offices.

3. Democratic leadership style was least practiced in the District Education offices since resolutions made during staff meetings were rarely supported nor implemented. The DEO rarely consulted subordinates to get their opinion on various issues and teamwork was rarely embraced as a strategy for improvement.

4. Autocratic leadership style was dominant in most District Education offices since the DEOs unilaterally made decisions and rarely accepted advice and criticism from members of staff. There was little room for other leadership approaches.

5. The DEO manipulated and determined decision making and activities in various departments and therefore there was no room for involvement of other staff members.

6. There was major communication breakdown between the DEO and the staff in most education offices.
7. The DEOs were perceived to be unsupportive and rarely provided a conducive environment that motivated the staff.
8. The DEOs were not committed to supporting quality assurance and standards programmes in most Districts.
9. The DEOs' personal traits greatly influenced their leadership styles.

Conclusions

Performance of the academic institutions in meeting the goals and objectives of education in Kenya relies heavily on the type of leadership that prevails in the institutions. This therefore means the top management must lead by example and so the leadership of the DEO is important. The challenges of the 21st century call for consulted efforts by both the leader and the subordinates through consultation and involvement in decision making so as to meet the goals of education and to drive the sector towards meeting the vision 2030 and the Millennium Development Goals. A shift from the traditional leadership styles is a prerequisite remedy to leadership challenges facing managers today.

From the above findings, the following recommendations were made:

- The DEOs' should integrate and employ varied leadership styles in management of education.
- The DEOs' should involve other staff members in decision making in various departments.
- Clear communication channels between DEOs and staff should be established;
- The DEOs' should be supportive and provide a conducive environment for staff motivation.
- The DEOs' should support Quality Assurance and Standards Programmes in the Districts.
- The DEOs' should delink their personal traits from office management.

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PROBLEMS
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CURRICULUM COMPARISON OF THE TERTIARY EDUCATION PROGRAM OF CAPITOL UNIVERSITY FOR THE 2008-2009 GRADUATES

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Abstract

The study looked into the variances and differences of the two curricula of Capitol University College of Education for the graduates of Academic Year 2008-2009, and the performance of the graduates who opted to take the Licensure Examination for Teachers (LET) of the same year. The University produced 39 Education Graduates from two separate curricula implemented, wherein 25 were from the old curriculum and 14 were from the new one. The study specifically monitored the academic, practical and national performances of the Bachelor of Science in Education (BEEd) graduates, at which the academic criteria focused on their marks according to the university standards for General and Professional Education, as well as marks from the Mock Exam (as a course requirement); practical performances measured according to marks given by supervisory instructors during their practicum or Practice Teaching. These marks were then statistically derived to represent the general training these graduates received from Capitol University.

The LET results of 2009 were used as the benchmark to determine the performances of the curricula stated. Along with information gathered from graduate insights and job experiences, the study highlighted on the perceived identified strengths of the both curriculums as an add-on experience to further improve the LET performances of the incoming graduates for the Education Program of Capitol University. The new curriculum is currently implemented in the University, with the distinction specific to the Department awarded by the Commission on Higher Education (CHED) as a center of Excellence.

Key words: *accreditation, curriculum comparison, Licensure Examination for Teachers (LET), performance.*

Introduction

An educational curriculum anchored in strong academic principles effectively finds its way to its elements (the students) as designed (Chickering, 1991). As time passes, these principles are subjected to new challenges that sprout from technological and industrial developments which shape and reshape opportunities and circumstances. Thus, the academic principles in focus of this contention change; some aspects are removed because of inapplicability and irrelevance, others evolve and take on a new label. Others are built out of sound understanding, while some are derived out of scientific observation and implications from trends and analysis (Rosenberg, 1997).

The Philippine Higher Education system subjects itself to several methods of quality checks that act as ‘safety nets’. These methods qualify certain institutions if the programs they are offering are standardized according to design. These designs, in a broader perspective, are attached in the norms that constitute employability, program blueprint, feasibility in operation and operation, and the like.

Quality checks are in place to determine to what extent the program stands. Some findings from various studies recommend action ranging from minute changes regarding the expansion of library resources to drastic measures such as the complete revamp of a curriculum as manifested by very low passing rates in national/professional service exams. This strategy allows institutions to exhibit qualifications bestowed upon them, provided that they comply and pass the assessment initiated by the certifying body. Institutions also use this leverage to advertise the operational services they have for their clients; documented portions of the perceived quality present in the systems they have in place are displayed for other institutions to see or scale (PACOCOA, 2009).

One of the key accreditation systems commissioned by Capitol University is Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA). Along with the Colleges of Business Administration and Liberal Arts, the accrediting body visited the department and granted Level III re-accredited status on February 17-19, 2009.

In 2004, the Commission on Higher Education (CHED) issued Memorandum no. 52, 2007 with a subject of the revised policies and standards for undergraduate teacher education curriculum in accordance with the pertinent provisions of Republic Act No. 7722, otherwise known as the “Higher Education Act of 1994” and the purpose of rationalizing the undergraduate teacher education in the country to keep pace with the demands of global competitiveness. To guide Higher Education Institutions (HEIs), Article V Section 7- Curriculum Description states that “the curriculum design includes: foundational general education knowledge and skills, theoretical knowledge about teaching and learning, methodological skills, experiential knowledge and skills and professional and ethical values, and subject matter knowledge appropriate to the level of teaching (i.e., pre-school, elementary, or secondary)” (Admin, 2009).

These memoranda empowered all Higher Education Institutions to subject themselves to several methods of checking to ensure that the programs they are offering are in line with the mandated of the Commission. These methods qualify certain institutions as they check in the norms that constitute employability, program blueprint, feasibility in operation and services, and the like.

Purpose of the Research

This study focused on the evaluation of CU graduates from the College of Education in school year 2008-2009. This specific academic year is uniquely identified by the researchers because it is the year where graduates from the College of Education emerged from two distinct curriculums. The first group of students is a graduate of the old curriculum, while the other group is a product of the newly implemented curriculum.

With this outcome in hand, the consideration of strengthening the old curriculum is no longer viable, since the curriculum itself is removed from the program and replaced with a new one. The remaining students of the old curriculum were re-evaluated of their credits earned and routed to finish the program under the new curriculum.

The study used the academic performances of the graduates from five (5) different outputs during their final year in the university. These areas include the grades they earned from General Education subjects, Professional Education Subjects, Practice Teaching Grades and Licensure Exam for Teachers (LET) results.

The research specifically contextualized the following concepts in an operational parameter. Each graduate will be a representative of the curriculum they graduated from with strong consideration that they experienced the program as described.

Specifically, the study attempted to provide answers to the following questions:

1. What are the general academic performances in three areas (General Education, Professional Education and Practice teaching) of the compared graduates of CU?

2. How are the Board Exam results of these graduates?
3. Are there significant effects of the CU training to the performance in LET?
4. What are the recommendations set from the findings regarding the factors that influence the performance rating of CU Education graduates?

This research is also set provide the international academic community information from a specific case of a teacher education program from the Philippines. This does not, however, represent the country as a whole, but to a certain extent, re-affirm the institution's stand as a recipient of the Center of Excellence Award from the Commission of Higher Education. It should also be noted that the respondents and their academic performance are not the decisive factor involved to achieve such distinction, but are in place to further enhance the CU-COEd (Capitol Unversity – College of Education) program through time.

Methodology of Research

The initial phase of the study identified all the graduates of the College of Education for SY 2008-2009. The list was eventually trimmed down to the graduates of BEEd identified with 13 graduates from the old curriculum and 8 graduates from the new curriculum. It utilized two curricula types implemented on the start of the academic year of 2004-2005. The old curriculum is framed on the CMO 11, s1999 and likewise, the new curriculum was framed on the CMO 30, s2004 from the commission on higher education. It identified four (4) variables, namely General Education (GenEd) marks, Professional Education (ProfEd) marks, Practice Teaching (or teaching internships) and Mock Exam (also known as Pre-board Exam). The following variables are detailed below:

- General Education – The University has 81 units allotted for General Education. This is a program of courses in the Arts and Sciences that provides students with broad educational experience, at which the courses are typically introductory in nature. It provides fundamental skills in Mathematics, English, the Arts, Humanities, Biological and Physical sciences, and is usually a requirement for baccalaureate degree.
- Professional Education - the University allotted 75 units (15 subjects or courses) for Professional Education. It is a program under teacher education that provides technical and career proficiencies with strong academic and theoretical concepts through a series of core and specialized subjects. It is also designed to foster strong understanding and experience relating to disciplines in the academe preparing students for leadership roles in educating the community and beyond.
- Practice Teaching - The CU-COEd program exposed the students to an actual teaching environment and labeled this training as Practice Teaching. Students are assigned in classrooms as shadow teachers or teacher assistants, wherein the classroom supervisor provides a candid and qualitative rating at the end of the program
- Mock exam – This is the review program implemented by the University where experts in the LET review are invited to facilitate a testing procedure to simulate the testing environment. Aside from refreshing concepts from the four years of the education program that might be present in the Licensure exam proper, the program is also designed to remove anxiety and anticipation problems of the exam-takers by gradual and systematic simulation and advising. Contents of the answers of the exam takers are also rated like a regular LET exam along with techniques that might be useful in the exam proper.
- Licensure Exam for Teachers (LET) – this is the bi-annual exam administered by the Professional Regulatory Commission. Graduates need to present proof that they

have successfully completed the education program from an accredited institution. Upon evaluation and approval, an applicant needs to specify what area of teaching expertise he/she will be identified with. The examination usually takes the whole day, and upon successfully passing the test, an applicant may then be allowed to register as a professionally qualified teacher in the Republic of the Philippines.

With the available data, the research methodology involved the following procedures and methods:

1. Establish performance rating of the graduating class of 2008-2009 in terms defined by the official Capitol University grading system.
2. Secure the academic performances of the senior students from the graduating class of 2008-2009. Each subject/course was identified if it belongs to the Professional Education (ProfEd) Subjects or General Education (GenEd) Subjects. This can be obtained by officially requesting the program coordinator to provide the ratings of the student-respondents covered in the study according to the academic year they spent in the institution. The University grading system is a pre-defined system of evaluating student performances ranging from the lowest value of 5.0 (failed), 3.5 (passed) up to 1.0 (excellent). It composes student output from examination, quizzes, class performances, projects, term exams and special activities trom three (3) terms (Prelim, Midterm and Final).
3. Secure Practice Teaching marks from the registrar. This information is also crucial to validate marks previously released by the program coordinator and to cross-check their accuracy.
4. Update actual LET performances from PRC. LET results also need to be categorized to determine performance variations. The PRC releases two LET results per year on national publication, but institution performances are dispatched to the academic community through registered mail.
5. Perform comparative, linear regression analysis on the said data to arrive on conclusions on how and why such performances behaved according to applicable statistical tools. Linear regression (Rodriguez, 2010) is powerful than other non-parametric methods, the limited number of cases in the present sample and the type of measurement used constraints to provide an accurate basis of generalization. General log-linear modeling is a set of methods and procedures to obtain a model of association between variables.
6. Derive Models from Log-linear analysis. This deals with association of categorical or grouped data, looking at all levels of possible main and interaction effects with the primary purpose of finding the most parsimonious model which can account for cell frequencies in a table. Logit modeling is similar to log-linear modeling but explains one or more dependent categorical variables.
7. Perform The Goodness – of – fit test. This measures the acceptability of the model by the likelihood of the ratio of its chi-square. For two – way tables, traditional Pearson chi-square may be used also. Both are based on assessing the difference between observed cell frequencies and frequencies predicted by the model. A significant likelihood ratio means that one rejects the null hypothesis that the researcher's restricted (parsimonious) model does not differ from the trivial saturated model (Heinrich, 2004).

Results of Research

The two education curricula differ and concur with each other. Both programs allow students to graduate when they successfully complete the courses designed by their specific CMO's, granting them the title of a bachelors degree. On the other hand, several subjects were improved in the new curriculum, and at some, an additional of one (1) unit was added to Professional Education Programs (what used to be a 3-unit course became a 4-unit course, with a unit of coursework added). What used to be a 12-unit practice teaching course from the old curricula was implemented as a 6-unit course in the new curricula; the six units gained was then redistributed to six professional education subjects as field studies. This was immediately implemented in the new curricula.

The respondents were rated according to four (4) variables common to them, namely: average of the final marks from the General Education & Professional Education components of the program, marks from Practice Teaching, and marks from the Mock Exam. These variables were used as independent factors that contribute to the success or failure in their specific LET results.

Out of the 13 graduates from the Old curriculum, 46% (6) passed the LET, while 75 % (6 out of the 8) of the graduates from the new curriculum also did the same. The 2009 LET was based on the Table of Specifications (TOS) of CMO 30, s2004.

The count of graduates was limited only to the graduates of the Bachelor in Elementary Education (BEED). The ratings in General Education and Professional Education were subjected to a five-level Likert scale.

First, the study looked into the performance of these graduating students in terms of their marks in subjects concerning the field of General Education. The following table summarizes the ratings:

Table 1. Curriculum Performances according to Verbal Interpretation, General Education.

General Education				
Interpretation	*Old curriculum*		*New curriculum*	
	f	%	f	%
Fair	4	30.8	1	12.5
Satisfactory	2	15.4	2	25
Very Satisfactory	7	53.8	2	25
Excellent	0	-	3	37.5
Total	13	100	8	100

The CU-COEd program has 81 units allotted for General Education. From the 13 graduates of the old curriculum, a large number of them performed very satisfactorily, although no one got an excellent rating. The new curriculum produced two (2) graduates with impressive excellent marks.

Table 2. Curriculum Performances according to Verbal Interpretation, Professional Education.

Professional Education				
Interpretation	*Old curriculum*		*New curriculum*	
	f	%	f	%
Fair	1	7.7	0	-
Satisfactory	7	53.8	2	25
Very Satisfactory	4	30.8	5	62.5
Excellent	1	7.7	1	12.5
Total	13	100	8	100

On the other hand, the same program has 75 units allotted for Professional Education. From the 13 graduates of the old curriculum, only one of them performed excellently while the rest just performed very satisfactorily and satisfactorily. The new curriculum graduates produced also one (10) graduate with impressive excellent marks with the rest having very satisfactory and satisfactory ratings.

Table 3. Curriculum Performances according to Verbal Interpretation, Practice Teaching.

Practice Teaching				
Interpretation	*Old curriculum*		*New curriculum*	
	f	%	f	%
Satisfactory	2	15.4	-	-
Very Satisfactory	6	46.2	6	75
Excellent	5	38.5	2	25
Total	13	100	8	100

The CU-COEd program exposed the students to an actual teaching environment and labeled this training as Practice Teaching. Students are assigned in classrooms as shadow teachers or teacher assistants, wherein the classroom supervisor provides a candid and qualitative rating at the end of the program. From the graduates of the old curriculum, a large number performed very satisfactorily, while five of them got excellent ratings. The new curriculum graduates produced two (2) graduates with impressive excellent marks, while six performed well with very satisfactory marks.

Table 4. Curriculum Performances according to Verbal Interpretation, Pre-Board Exam Results.

Pre-board Exam Result				
Interpretation	*Old curriculum*		*New curriculum*	
	f	%	f	%
Failed	1	7.7	-	-
Poor	11	84.6	5	62.5
Fair	1	7.7	3	37.5
Total	13	100	8	100

One of the features unique to the Capitol University is the inclusion of a review course in its regular student academic load on their fourth and final year. This subject is a review course of all subjects taken during the stay of the students in the university at which its examination protocol might provide a simulation of the board exam. Students are given examinations in different subject matters, with answering procedures similar to that of the Licensure exam for Teachers (LET). The graph above shows that the old curriculum graduates performed poorly, while majority of the new curriculum graduates also performed this way.

Finishing the BEEd course usually takes four years. A graduate is then recommended to take the Licensure Exam for Teachers (LET) administered by the Professional Regulation Commission (PRC). The commission is an independent body formed to regulate and certify discipline specific professionals from the Philippines. A document from their website (PRC, 2011) indicates the summary of their services, stating:

> “The Professional Regulation Commission is responsible for the administration, implementation and enforcement of regulatory policies on the regulation and licensing of various professions and occupations under its jurisdiction. It is the instrument of the Filipino people in securing for the nation a reliable, trustworthy, and progressive system of developing professionals whose personal integrity and spiritual values are solid and respected, whose competencies are globally competitive, and whose commitment to serve the Filipino nation and the whole community is strong and steadfast. “

21 graduates from the BEED program of Capitol University, with 13 from the old curriculum and 8 from the new curriculum were monitored in this study. The examination encompasses two fields, namely: 1.) the General Education concepts, and 2.) the Professional Education concepts. By definition, a graduate takes the exam and has to achieve an average grade in the two fields of at least 75% (Capitol University, 2009).

From the 13 graduates of the old curriculum who took the board exam, 46% of the takers passed the exam while 54% needs additional intervention to make it through. The new curriculum applicants fared better with 75% of them earning their license to teach, while a quarter of the takers were on the threshold of passing the said exam.

Table 5. Curriculum Performances and Board Exam Results.

Licensure Exam for Teachers (LET) Results				
Interpretation	*Old curriculum*		*New curriculum*	
	f	%	f	%
Failed	7	53.8	2	25.0
Pass	6	46.2	6	75
Total	13	100	8	100

Regression was used to determine the significant effect/s of each variable to the LET performance, while two models were formulated to represent the mathematical relationship of significant factors pertinent to the LET results of the graduates.

Statistical Model 1- Using Linear Regression (LET results as Interval Data)

This statistical model answers the question whether the 5 identified independent variables (Grades in General and Professional Education and Practice Teaching, Pre-board performance and Curriculum), when used as independent factors, will have specific significance to the graduates' performance on the actual Board Exam results as dependent variable. The first model uses the actual published grades of the CU examinee as ordinal data.

Table 6. Co-efficient and p-values.

Co-efficient	p-value
$b = 71.38$	0.145
$b_1 = 1.87$	0.007
Beta coefficient, r = 0.574; r2 = 0.329, p = 0.007	

Thus, this model was derived:

Model 1: Y = 71.38 + 1.87 Pre-board

Table number 6 explains the degree of correlation between the independent variables as a whole and the dependent variable is moderately strong with a coefficient of 0.574 and significance level at 0.007. Only the pre –board result has significant effect on the licensure performance of students in this model which indicates that about 33 percent of the variation of result in the pre-board explains the random variation in the licensure exam result. Other variables (e.g. Grades in General, Professional Education & Practice Teaching and Curriculum types) did not pose a significant impact on the performance of the board exam results.

Statistical Model 2- Using General Log-linear model (LET results as Categorical Data)

The data above is reduced to this General Log-linear model:

Model 2 = Constant + [Preboard = 1] + [GenEd = 4]*[Prof = 4] + [GenEd = 2]*[Prof = 3] + [Teach = 4]

The Design is the performance of the students with all the variables considered, while the Constant is the effect of the board performance when all the other variables are at 0. All other values are generated from the Log-Linear analysis. The variable and values under 'curriculum' has been removed from the model because they are not needed to explain the observation.

Table 7. General Log-Linear Analysis Results.

Dependent Factor (Y)

Parameter	Estimate	Z- value	Odds ratio
[Pre-board = 1]	1.3863	2.48	4
[GenEd = 4]*[Prof = 4]	1.6094	1.47	4.99
[GenEd = 2]*[Prof = 3]	1.3863	1.24	4
[Teaching = 4]	0.539	1.13	1.71

The odd ratio is the exponential value of the parameter estimate b or Exp (b). Odds ratio is the ratio of two odds. Odds ratio of 1.0 indicate no effect. Odds ratios greater than 1.0 indicate the variable in question increases the odds associated with the dependent variable. Odds less than 1.0 indicate the variable decreases the odds. The odds ratio is the probability of an event to occur divided by the probability of the corresponding event not to occur.

From the Table of Log –linear analysis, at least getting a rating of 1 in the pre-board exam has four times the odds of passing the licensure exam over and beyond those predicted by other variables. A student who has very satisfactory performance in the General Education and Professional Education has 5 times the odds of passing the licensure exam but the result is not statistically significant or the effect is not associated with the changes in the cell frequencies which are predicted by other variables. Students with very satisfactory rating in their teacher practicum have about twice the odds of passing the licensure exam. This is not significant as well.

Table 8. Test of Goodness of Fit.

Statistics	χ^2	df	p
Likelihood Ratio	38.04	124	1.000
Pearson	55.38	124	1.000

The goodness-of-fit result above shows the acceptability of the model being tested above. The researcher tested the values to see if a restricted model does not significantly differ from the saturated model.

Conclusions

Based on the results the following conclusions are derived:

The Linear Regression model used the five variables against the LET results and concluded that only the Pre-Board results variable has significant effect on the performance of the LET results. The General Log Linear model also used the five variables against the LET results, but the goodness-of-fit criterion removed the variable 'curriculum' as it failed to satisfy the likelihood ratio chi-square and Pearson chi-square test. The University implemented both CMOs effectively, providing the study a conclusion that the high performance of the first 3 variables (GenEd, ProfEd Grades and Practice Teaching) as indicators of a robust curricula that addresses the contexts derived from the said parameters. While both models conclude that only the Pre-Board results variable has significant visible effect on the performance of the LET results, it is safe to theorize that the implementation of both curriculums reflected the immediate address of the needs identified with the first three identified variables. This would also in acquiesce with Capitol University's thrust in providing high quality teacher education. However, the limitation and inadequacy of data available for this conclusion could also be a factor.

Recommendations

This recommendation is focused on the finding that the odds are high for students earning high marks in Pre-board exams are more likely to pass the actual Board exam than all the other factors considered. This generalization is also supported by both models presented above.

It is highly recommended to strengthen the Pre-board Program currently implemented by the University by adding more hours to student engagements. This can be made possible by attaching mock board-exam testing as a simulation at the end of each course identified with General and Professional Education.

This practice may lessen student anticipation as a stress factor that is identified with National exams. By integrating board-like simulation exams at the end of each course, more time is allotted to the attuning of the students' perspective in taking licensure exams. In addition, it will also expose them to scenarios like these as early as possible, giving them the opportunity to loosen up easily during the actual exam.

The pre-board exam activities currently undertaken by the university are perceived to be of great help to the graduates, as its content and methods defined contribute much to the ability of a graduate to pass the exam.

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LEARNING FOR THE ENVIRONMENT: A TEACHING EXPERIENCE WITH SEMI-SCRIPTED ROLE PLAY

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Abstract

Getting students to act out their roles and to apply appropriate arguments for and against their position as defined by the role is a challenge in approaching and exploring an environmental issue through role-playing. This action research addressed this concern by exploring how a semi-scripted role play could be used to promote active student learning in a Science, Technology and Society (STS) lesson. Using greenhouse effect as an example of environmental issue, this study explored how students playing different characters articulated their response to the semi-scripted role play setting. A group of 26 master students who took Science, Technology and Society (STS) as a core course took part in research and carried out a role play in groups of six for a period of two hours. The multiple data sources for this study consisted of student's written reflections, an informal and unstructured observation, and Role Play Evaluation Form. Overall, the students indicated that the semi-scripted role play helped them understand an environmental issue both from their own and other's perspective. The provision of guiding information via semi-script enabled students to feel empowered to express, share, argue, and negotiate more comfortably and confidently. In addition, students indicated that the role play helped them to develop critical thinking. The role play had helped create an engaging and productive learning experience that educators could use this exercise to lead students in the exploration of broader local environmental issues.

Key words: *action research, environmental issue, semi-scripted role play, Science, Technology and Society.*

Introduction

Environmental challenges and issues such as climate change, air and water pollution, the degradation of biodiversity and increasing garbage are among the main concerns in every part in the world. Environmental education (EE) is one of the tools used to create awareness and generate action regarding these challenges among the people. According to Stapp (1974), environmental education is a means by which educators can assist students to develop a greater understanding on solving problems of their ever-changing world as noted as follows:

> "Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the total environment and its associated problems, aware and skilled in how to become involved in helping to solve these problems, and motivated to work toward their solution" (Stapp, 1974, p. 49)

Hence, through the process of EE, individuals acquire knowledge and skills necessary to form judgements to participate in decision-making and to take appropriate action in solving environmental issues and problems. According to Hungerford & Ramsey (1994, p.16), to develop an effective citizen who are able to contribute to the solution of environmental issues, she or he should acquire 1) the ability to analyze issues and correctly identify the individuals or groups involved in issues and their beliefs and values; (2) the ability to investigate issuesin a manner so as to identify the facts surrounding them and their proposed solutions, along with their social, economic, political, legal, and ecological ramifications; (3) the ability to evaluate issuesand to determine the most effective means of resolving them. One of the curriculum approaches of environment education to develop those abilities is education or learning for the environment.

The learning for the environment approach explicitly aims to develop concern and responsibility in students through helping them make decisions about resolving environmental problems and taking appropriate action (Huckle, 1993). Via this approach, students will be able to consider the values and attitudes that underpin people's responses to the environment and, in so doing, clarify their own values (Murdoch, 2007). As such, appropriate teaching approaches need to be chosen to show how those abilities may be practically realised during the investigation of an environmental issue.

Hungerford & Ramsey (1994) suggested the issue investigation skill approach for dealing with environmental issues. The intent of the issue investigation approach is to develop in students the skills involved in issue investigation and resolution so that they can be applied throughout life (Hungerford & Ramsey, 1994). This recommended approach can be met through the use of role play. According to Hungerford & Ramsey (1994), role-play provides students with practice in making important decisions and in developing action-oriented human relations skills. Sogorno (2004) defines role play as:

> A learning activity in which participants act out a set of defined role behaviours or position with a view to acquiring desired experiences. A role-playing scenario could be mimicking, demonstrative or illustrative of specific concepts, problems or situations. (p. 356)

This definition clearly demonstrates that student is presented with a scenario consisting of these elements – role, context, and function or purpose. Sogorno (2004) highlights the purpose of the role player, within the given context, 'is to feel, react and behave as closely as possible to the way someone placed in that particular situation would do'. This process enables students to feel their way into likely reactions of the characters, as they perceive them. Hungerford & Ramsey (1994) note that role-playing permits the learner to get inside the issue as he/she assumes the role of a particular player and interacts with other players in attempting to resolve the issue. The student's power to bring characters to life extends their sympathy and sense of responsibility towards their environment.

According to Errington (1991), the successful execution of a role play is dependent on players' perceptions of how people in specific roles 'do' or 'should' behave within certain social contexts. In other words, role players need to consider the beliefs, attitudes and behaviour of those who hold these roles in real life. This is essential for role players to throw themselves successfully into the role within certain social context. In order for this to occur there has to be a supportive learning environment. As Tolan and Lendrum (1995) have asserted that role play is able to 'stimulate the imagination and enable course members to engage with people's concerns and complexities within a supportive environment'. Students have been reported to find role play exciting and challenging when it is implemented as a teaching strategy (Tolan&Lendrum, 1995). Educators have found role play to be a powerful teaching strategy (van Ments, 1983). In other words, learning activities should be appropriately structured and carried out so that learners gain maximum benefits from a role play.

According to Nestel and Tierney (2007), the four learning environments suggested by Kolb and Fry (1975)'s theory of experiential learning is especially important in the execution of a successful role play. These include the affective, symbolic, perceptual, and behavioral learning environments. The affective learning environment emphasizes concrete experiences so that students actually experience what it might be like to be an assigned role in a role play. The symbolic learning environment is one in which learners are involved in trying to solve problems for which there is usually a right answer or a best solution. The perceptual environment emphasizes the process of problem solving in which learners are required to approach a problem situation through different perspectives (own opinion, expert opinion and literature) by listening, observing, discussing and personal pondering. Learning processes may include reflective exercises such as keeping journals, writing reflective essays, or engaging in dialogue with other students. Such practices are incorporated into each class session, which emphasizes the importance of reflection on learning. Finally, the behavioral learning environment emphasizes actively applying knowledge or skills to a practical problem. Activities should be structured so that learners gain intrinsic rewards and values. Consequently, educators should consider how to incorporate each learning environment suggested by Kolb and Fry (1975) into a role play.

In Malaysia, EE is taught across the Curriculum and integrated in each subject from Science to Religious Studies in both primary and secondary schools.Malaysian Curriculum for both pre-service and in-service teacher education has made clear the approaches teachers should adopt when realising environmental education across the curriculum (MOE, 2003). Role play has been identified as an important teaching and learning strategy in motivating students to take an active role in exploring EE issues.

Science, Technology and Society (STS) is a core course offered by most master Science Education programme in the Malaysian university. The fundamental aim of Science, Technology and Society (STS) is to equip students to understand and situate scientific and technological developments in their cultural, environmental, economic, political and social contexts (SPPS, 2011). Students are encouraged to engage in issues pertaining to the impact of science and technology on society and the environment and make responsible decisions about how to address such issues. For example, rather than learning about the facts and theories of weather patterns, students can explore them in the context of issues such as global warming.

As an educator in the area of environmental education, STS was always believed to be able to manifest the responsibility in a very practical way – through the activities in which students were engaged in classrooms. Helping students to recognize their dependence on the natural world developed a stronger sense of responsibility towards reducing the environmental problems. One of the central concerns as an educator and researcher was how to engage the students in active learning. The researcher had always felt that a student-centred approach is essential to allow students engage actively in exploring the applied aspects of environmental issues.

It is not always possible to have students investigating environmental issues within direct life situations. For example, students may not have the chance to walk through a rainforest, or to be present at debates on rainforest conservation. In this sense, some environmental issues may only be simulated and investigated from student learning experience in the role play. Via a role play, there is a chance for students to express their personal and shared views regarding a stance on an environmental issue (Errington, 1991).

Considering the benefits of role play in investigating an environmental issue, the researcher decided to use role play in a Science, Technology and Society (STS) lesson. It was thought that this was especially relevant in getting students engaged actively in resolving environmental issues or community problems.

Background to the Problem

The researcher's first experience with the use of role play took place in a lesson for a group of 26 master students who took Science, Technology and Society (STS) as a core course towards a master degree in Science Education. A whole-class role play was adopted with the hope that students could engage actively to point out their views on resolving an environmental issue. Students were initially placed into groups of between 3 and 4 people. Students were then told that they were representing different groups that had a vested interest in a piece of land on the hillside. Each group had an area of interest identified, within which each group was required to present an argument reflecting its interests and concerns. For example, one group was representing housing developer and its area of interest was opening up the land for building luxurious housing lots. On the other hand, an environmentalist would be more concerned about protecting the land from development. Each group was then to give a press conference, where they were to outline these interests and concerns.

It was found that the students had difficulty to act out their roles and to apply appropriate arguments to support their interest and concern as defined by the role. Students should be able, to some degree, adopt the role of the interest group they represented. They had actually been asked to research the issue from the perspective of their assigned roles a week prior to the role play. The allocated tasks simply did not prepare them for the role play, and so additional time was being used for them to revise their roles prior to the role play. The doubt about the ability of students to perform in the role play led to the following concerns: - How did I facilitate and engage students in their learning via role play? What action did I need to take to help engage students in an active role? What were the students' views towards my actions?

With these questions in mind, the researcher decided to explore another way of role play for students to engage with the environmental issues. It was considered that a smallgroup teaching environment might provide students with better opportunities to engage in active learning. So researcher decided to explore how a semi-scripted role play might be used to support students as they brain-stormed for their view points about environmental issues. The semi-scripted role play is a sequence of instructions of the order of interaction between players, with the occasional line of dialogue to ensure that key statements are made (Milroy, 1982). The literature has highlighted the major strengths of using scripted role play, especially in providing students guiding instructions during the role play (Alden, 1999). This would give the instructor and student security from the fear that the activity would wander from the intended focus. This raised in researcher's mind the issue of how the greenhouse effect would be examined within a small group semi-scripted role play.

Greenhouse effect refers to the observed warming that results when solar radiation is trapped by the atmosphere; caused by atmospheric gases that allow sunshine to pass through but absorb heat that is radiated back from the warmed surface of the earth (Darlene, 2006). Intergovernmental Panel on Climate Change, the leading authority on global climate science, attributes most of this warming to human activities, notably the burning of fossil fuels and the destruction of forests (IPCC, 2001).

The examination of greenhouse effect could engage students to formulate their own opinions from the viewpoint of specific roles related to the global climate. Slight changes to the role play were made by preparing guiding instructions in a semi-script that relate to the role they played. The instructions did not tell students specifically what to say. These instructions only assisted students to prepare to take a particular position from the assigned character's perspective. This was particularly important for students who were not familiar with the assigned character. It also gave security from the fear that the activity would wander from the desired focus of the role play. The hope with this change was that this more "guided" approach in character preparation would further motivate the students to take responsibility for their own learning.

Accordingly, the purpose of this action researchwas to explore how students playing different characters articulated their response on greenhouse effect to the semi-scripted role play setting. Specifically, the present study set out to answer the following research questions:

What were the student's thought regarding their learning engagement in the semi-scripted role play?

Methodologyof Research

A group of 26 master students (11 males, 15 females) who took Science, Technology and Society (STS) as a core course in Science Educationtook part in this study. The master students were 8 primary and 18 secondary inservice science and mathematics teachers and their age ranged from 28 to 40. The in-service teachershad4-16 years teaching experience, entered the master programme for a two-year period (four semesters).The students who took this subject had all possessed a degree in Science and Education major in Biology, Chemistry, Mathematics and Physics.

The relevant educational literature on the subject (Alden, 1999; RECSAM, 2000) and Kolb and Fry (1975)'s four learning environments were refereed in preparing this semi-scripted role play. This had an impact on the way the role play was conducted. The class was divided into four groups and a chairperson was assigned to lead a 60-minutes role play for the group. The approach for the semi scripted role play was set in four steps as presented in Figure 1. Firstly, students were introduced to the nature of the role play. Students in a group of six were going to take part in a role play between different members of a United Nations committee. There were six players on this committee and each player had specialist knowledge on the greenhouse effect. These players consisted of Earth Science Expert, Expert Chemist, Chief Geologist, Environmental Spokesperson, Economic Spokesperson, and Spokesperson for the car manufacturers. These roles were chosen to illustrate the complexities associated with addressing issues that are scientifically and economically global in scale.

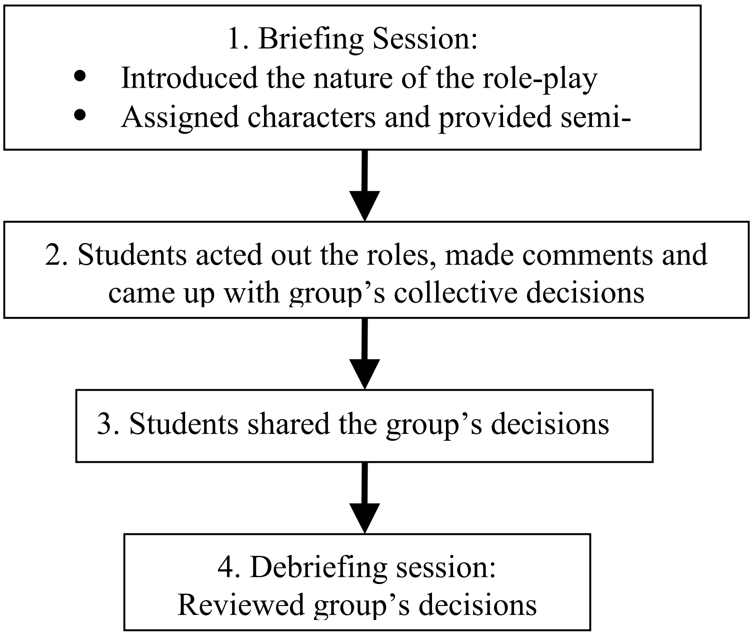
1. Briefing Session:
• Introduced the nature of the role-play
• Assigned characters and provided semi-
2. Students acted out the roles, made comments and came up with group's collective decisions
3. Students shared the group's decisions
4. Debriefing session:
Reviewed group's decisions

Figure 1: The approach used for the semi-scripted role play.

A small semi-script with brief descriptions of the player's characters was then distributed to each student playing the particular character. For example, one of the semi-scripts as follows assisted an Earth Science Expert to respond at a particular position in the role play.

> "You are concerned about the amount of carbon dioxide entering the atmosphere. You believe that as more fossil fuels are burned, carbon dioxide levels increase. This creates the greenhouse effect on Earth, because heat energy is trapped by the carbon dioxide layer. You think less fossil fuel should be burned."

The players were given ten minutes to read over their character descriptions before the performance. They were also invited to consider what it was like to take on someone else's role and to face a challenging problem within selected context. Role players were encouraged to ask their own questions, for example, 'What are my thoughts and feelings about this issue? What would be this role holder's beliefs?' What choices are open in terms of relevance to all parties? This also allowed an examination of different viewpoints.

Secondly, the players who were to act out the roles were to make some comments about the likely causes of the so-called greenhouse effect. Each player could then say who they agreed with and who they disagreed with and why.

Thirdly, each group would have to reach a collective decision or statement to be presented to the rest of the class saying what they had agreed upon and what things they disagreed about. Awareness of the scientific and economical perspectives of global environmental issues established a base for such an informed decision making. Fourthly, a debriefing session would be undertaken in which the group statement was reviewed under guidance of the researcher as facilitator.

Using Semi-scripted Role Play in STS Lesson

On the day of the role play, the students formed a small group of six group members. Each student was then assigned a character and provided with a relevant semi-script. Students rearranged the furniture into four groups and sat in a circle. Once the groups were seated, the chairman lead the role play by asking the players to introduce themselves the character they played and to outline their character's view. The players were also reminded about the collective decisions that needed to be made by relying on input and consensus from all group members regarding the discussed issue. Students were observed working in groups, as they discussed the anticipated interactions prior to their interactions. Then the group's players took turns making verbal statements that reflect the character's perspective. For example, aneconomist who had to explain why his/her option was the best economically and scientist who explained why it's the best solution to environmental problems, and the group gave their persuasive argument. Students were observed to be a better involved in the nature of environmental issues than they had evinced in the previous learning session, and less time was spent revising the roles assigned for them.

The researcher had assumed that she would need to play a more active role but, from the very beginning, the students were busy pointing out their views through their characters. The researcher did intervene when she wished to reinforce an issue from a student who had been too vocal, but her own involvement was far less than she had anticipated.

In the previous role play exercises, students were not explained the role that they should play and how to respond from a particular position based on the assigned character's perspective. In contrast, this time more time was spent before, and at the beginning of, the role play explaining the nature of scripted role play and the expected learning outcomes of the activity. Students were told that all characters have roles to play and therefore each character would not be sharing the same viewpoint and that conflict might result. The class was also reminded that the people they were arguing with might not be expressing their own viewpoint; indeed, they might be arguing a position completely foreign to them. Unlike the previous attempts at role play, more time was devoted to “debriefing” at the end of the session. Each group was given ten minute to share on the outcomes of the role play.

Data Collection

Students were invited to write their reflection immediately after the debriefing session of the role play. Students were asked to reflect on the verbal interaction, the ways in which they had approached and explored the issue, and the ways that their experience might have enhanced their understanding of the issue of greenhouse effect. These written reflections on their learning experiences served as a primary data source. In addition, an informal and unstructured observation was carried out to recordstudent behaviors indicative of engagement in learning. The researcher acted as first observer while a lecturer was invited as second observer. Both observers recorded observations of the learning activities and interactions of students in a journal, these included students’ verbal and non-verbal responses during the running of role play. Role Play Evaluation Form was administered to students after the reflection to explore how productive the role play was (Appendix A).

Data Analysis

In the first stage, all students’ written reflection was reviewed by coding it into prescribed categories and a summary of the interpretations were prepared. Several recurrent ideas were identified within and among data sets. These categories were then compared and contrasted in order to form more general themes which captured larger aspects of the data. Having identified emergent categories and themes, the data sets were reread in order to identify specific excerpts which signaled these groupings so as to ground the analysis in the data.

In the second stage, the observation data was used to corroborate the emergent themes found in students’ written reflections. The validity of observation data was determined by agreement between second observer and the researcher. The quotes provided throughout the “Results and Discussion’ section were excerpted from written reflections and observations. All of the names provided are pseudonyms.

The written reflections were shared with a science lecturer as independent rater to check whether she interpreted the information in the same way. The congruence between independent rater and researcher in categorizing student’s thoughts was looked for to establish validation in the finding.

Results of Research

Notable changes were noticed in the students’ learning engagement during the semi-scripted role play. This was shown through themesemerged relating to the learning experience of students and observation made inthe semi-scripted role play as follows:

Learn to view environment issues from a range of perspectives

Originally, students only got to feel how they view the issues from their own perspective. But through this role play, they admitted that they learnt to consider and think about how others take a stand on and feel about an issue from other’s perspective. The following comments illustrate this:

"Arguing a position which is completely foreign to me is a good exercise. To think of an issue from one angle make me understand that how others view the issue from their perspective." (T2)
"The role play makes me learn more about the issues, from people's different perspective and experience." (T5)
"This activity let me stand in a different angle to think about an issue." (T10)
"I am able to understand the issue better and to correlate my own views with other's views." (T11)

It appeared that assuming the role of a particular character and interacting with other characters in attempting to resolve the issue allowed students to 'get inside' the issue. Students also mentioned that they had gained valuable input as a result of their experiences during the debriefing session. In some cases, they were confronted with new ideas and knowledge as reflected in the following excerpts:

"I learnt a lot of new ideas when teacher ask each group to share the group's idea." (T13)
"The activity is interesting. I like the "report session' after the role play. I got a lot of new info from other group especially about the idea of "replant' and 'reuse." (T15)

Feel more comfortable expressing and sharing views with peers

Students generally felt more comfortable to share their views in a small group role play. Explanations for this change were:

"I felt more comfortable to point out my idea when I discuss in a small group." (T16)
"I like to listen to others. Every group member has his/her own ideas and opinions." (T3)
"In this discussion, I felt very comfortable to express my view and points easily. Our group members works well each other and able to encourage others to contribute points. We also learn how to share opinions and listen to others." (T7)
"It is an interesting discussion. Each group member expresses their opinions in a comfortable way. I learn more from the discussion and listen to different opinions from different people." (T20)
"It has helped me give opinions freely, and get feedback and comments from other group members." (T21)

Observation data further confirmed that students were actively listening to the ideas of others. For example, as one student was pointing her/his views, the rest of the group members were listening attentively, without interruption to her/his argument. The group members subsequently use their reasoning to explain why they agreed/disagreed about from their point of view. It appeared that small group created a safe and active learning environment for students to participate freely in the learning process.

Take responsibility for own learning and making collective decision

Students found the role play had provided an environment to take responsibility for their own learning and making group decision as the following excerpts indicate:-

"The discussion today is very interesting. Each group member can point out their views and argue with each other, many issues were raised up but the agreement was reached in a peaceful way." (T11)
"The time is not enough to discuss, but lastly we come out with our group decision." (T19)

> *"Some arguments but can come up with a conclusion and agreement." (T20)*
> *"During the role play, I was trying to get more information to argue with others. At the same time I was able to hear other's views that opened my minds to an idea I didn't consider before, so actually we learn from each other." (T26)*
> *"I equip myself with sufficient knowledge in order to create a meaningful discussion.We learn to make our stand by relating it to benefit and problems faced by other communities." (T15)*

It was observed that, after each player representing an EE character had presented his/her views before others, that characters' player was given a little time to reflect on their response. Students then came up with a collective decision that involved thoughts and feelings from both sides of the issue and relied on input and consensus from all group members before making a collective decision. One major difficulty with the role play was the fact that the class had only 60 minutes for the discussion. The time was fully occupied but, in the last quarter-hour, the players became more focused on issues as they debated to reach a group agreement.

So even if the role play continued as a debate, it had given students a sense of ownership of the activity and thereby responsibility for the outcomes of the activity.Besides, half of the students noted that, "*I learnt more from the activities*". Thus, the more active students were in determining their own learning, the more they learned.

Have more confidence in personal learning abilities

Students generally felt confident in their own abilities to express their thought verbally about how they feel as an assigned EE character. As some of the students remarked:

> *"This activity helps me to express my thought about how I feel as an Economic Spokesperson for Brazil." (T 18)*
> *"Through this discussion, I learn to express my thought verbally." (T17)*
> *"Debating and confronting other's idea teach me to be more confident. I must have sufficient knowledge and evidence to support my idea." (T25)*

Students appeared to have made use of semi-script to reason about the global issues as defined by the role. This showed the provision of guiding instructions in the form of semi-scripts of characters at various points made students feel more confidence to express their views verbally.

Learn to make links and transfer ideas

During the defense of the argument that destruction of the forest contributed to the temperature rise, Chong was observed to refer to her prior experiences and evidence in Sarawak and Genting Highland to provide direct support for her argument. She attested to the following:

> *"The role play enables participants to give their views with supporting evidence instead of discussing aimlessly." (T24)*

Whereas another student expressed a similar idea, only in slightly different words:

> *"I did not discuss aimlessly, I gave my view based on evidence." (T22)*

Students appeared to link effectively their scientific knowledge of ecological concepts introduced in lectures that reflect their concern.

Active involvement

Based on observational data, students demonstrated high levels of engagement during this activity. Although some forceful argument did take place in the role play, it was clear from the outset that the students were quite animated in their role. For instance, Jenny who represented an Economic Spokesperson for Brazil opposed to the fact that deforestation contribute to the increase of planet's temperature. She was disagreeable and insulting at times, in her way debating style to try to defend her view and convince others to agree with her position. No doubt that she was simply embracing the spirit of the exercise.

Another student, Lee, representing an Earth Science Expert used Japanese accent while stressing his view. The way in which he acted like an Earth Science Expert from Japan was a clear signal to all that student was in character. Students who had been reluctant to speak before the role play now spoke. They now could make statements that reflect the character's perspective! As students articulated it very eloquently:

> *"Each of us involved actively in the discussion, no party was excluded. Everyone shared info and experience." (T12)*
> *"Each of us can take part. Everyone has her/his idea to point out, clarify, make judgement and negotiate before we make our stand."(T6)*

Promote critical and creative thinking

This appeared to be a constructive engagement among students as many of them expressed that the role play provided an opportunity to think critically and creatively:

> *"We have to analyze others' views before we give our comments. Therefore, it promotes my thinking and understanding." (T1)*
> *"The role play acts as a good strategy to stimulate our critical thinking. We need to think critically to support our stand. We share views based on evidence." (T4)*
> *"The discussion in a role play enables me to defend my views and confront other's view critically." (T8)*
> *"Role play discussion has given me an opportunity to learn to give my own views and at the same time to analyze other views with an open mind." (T9)*

Students also noted that the role play encouraged them to respond spontaneously to defend their views, hence extends their creative thinking.

> *"The role play really helps us to become more creative in delivering spontaneous idea." (T23)*

Learn to respect and value other views

Students generally felt that the role play provides an outlet for fostering respect and appreciation for diverse views as the following excerpts indicate:-:

> *"From the role play discussion, I found out that lots of ideas came out from all group members. I learn that I have to defend my point of view with facts and statistic. However, we cannot overlook the facts given by other members. All their point of view and opinion have to be taken into consideration."(T24)*
> *"I learn to respect each other during the dialogue as we must listen to the views of other." (T18)*

It is not surprising; therefore, that role play discussion has developed a learning community to value and respect for other students' contribution and differences.

The moral of the activity

In the debriefing session, it was surprising to find that none of the groups was supporting the view for human contributions to global warming. They all expressed concerned over the rapid increase in carbon dioxide levels in Earth's atmosphere which have contributed to changing weather patterns, ice ages, and fluctuations in sea level. All the groups agreed with the point that development still can be carried out, with the condition that a proper plan and management need to be thought carefully for the sustainability of the natural environment and resources. This was clear when one group made this statement that "*We think that protect our mother earth is very important. We really need development to make our life better but we don't forget that we live on the earth. If the earth becomes ill, how can we live comfortable*?"

Susan, who initially opposed rainforests protection was finally influenced by arguments and changed her existing stand. She learnt to consider the point that the fulfillment of human needs had to be balanced with the protection of the natural environment, so that these needs could be met not only in the present, but also in the future.

How productive was the role play?

At the end of the role play, students were asked to fill in an evaluation form specifically addressing how productive the role play was (Appendix A). The feedback was very positive, and the most significant comment was that a highly productive session had been held during the role play. The overall responses included:-

> *"Ideals were encouraged and fully explored." (96%)*
> *"We all stayed on target." (100%)*
> *"Discussion made to come out with genuine agreement of the issues." (96%)*
> *"A highly productive session was held." (100%)*

Additional written comments were:

> "*The discussion keeps us on track and avoids members to escape from giving their point of view."*
> "*Time is optimized and fully used to discuss our idea."*
> *"Have a clear view of the issues discussed."*
> *"Learn more from the activities."*

Students also found some value added to the role play. Their responses were:-

> "*Gain some new knowledge about the issues."* (92%)
> *"Many new ideas generated by group members."* (96%)
> *"My friends are too creative."* (92%)
> *"Make lesson more interesting and meaningful." (100%)*
> "*Ideals were brought out in a creative way."* (96%)

However, one concern brought out by some students that there were time constraints to discuss the issues because they *"have many ideas to share and explain to others"*.

How could semi-scripted role play be improved?

Despite the strong support for role play, the students were asked to consider ways in which the semi-scripted role play could be improved. It was found that only one student offered comment in response to this question as follows:

> *"Discussion in a role play form is interesting. However, choosing our own group partners is better as some of us dare not to speak out our opinions in front of someone who we do not know well." (T14)*

This suggested a weakness of face-to-face role play. The fear of looking or acting stupid or upsetting others might inhibit how an individual might act out a role.

Discussion

The Kolb and Fry (1975)'s four learning environments as employed in the semi-scripted role play had engaged students actively in evaluating and resolving an environmental issue.The engaging learning experience that students found from the semi-scripted role play was to feel how they view the issues from their own perspective and think about how others take a stand onan issue. Semi-scripted role play took students into a realm where they needed to consider the thoughts of others, and learnt to see different and broader perspectives. Role play thus helped deepen student understanding, and opened their minds to an idea they didn't consider before. This result is consistent with previous study showing that students are able to attribute to others motives they recognize in themselves after being helped to take the point of view of the other through role-playing (George & Lawrence, 1982). As Freeman & Capper (1998) remarked following an evaluation of their web-based role play, students "achieved a deeper understanding of their own views and those of others."

Compulsory participation in a small group role play broke the ice and built the confidence. The students had the opportunity to discuss democratically and negotiate situations. As participation grew, ownership grew and that bond led the students to make collective decisions. Students knew that they were full partners in this learning environment and shared the responsibility for the learning process. Hungerford & Ramsey (1994) also found that students in a role play not only become experts regarding an issue, but they also derive a sense of ownership toward that issue.

The provision of guiding instructions in the form of semi-scripts assisted students to respond at a particular position from the assigned character's perspective. At the same time, students were encouraged to reflect on their learning by asking questions on what it was like to take on someone else's role. As a consequence, students felt more comfortable and confidence to express and share their views verbally.

A small-group learning environment had provided students with better opportunities to engage in active learning. Students were animated in their role even though they argued a position which was completely foreign to them.As Errington (1991) noted that learning in environmental education by means of a role play is able to engage students in active learning experiences. Students also became more comfortable with expressing their opinions in a small group role play setting. As a group, students felt comfortableenough to contribute ideas and actively listen to the ideas of others.Keogh and Naylor (2007) noted that an appropriate climate allows pupils to feel comfortable about sharing their ideas and misconceptions without ridicule or embarrassment. Not only that, small group role play setting had fostered respect and appreciation for diverse views. Students learned to respect and value other views even though they were not sharing the same viewpoint.

In addition, students appeared to use appropriate ecological concepts to provide direct support for their argument that reflect their concern. As Alden (1999) has claimed that role play encourages students to reflect on their knowledge of EE and to use appropriate concepts when articulating their response to the role play setting.

Semi-scripted role playencouraged students to begin thinking critically about an environmental issue as theyanalyzed others' views, made and defended distinctions, and sought evidence. Consequently, critical thinking is enhanced when students learn to teach themselves to analyze ideas, weigh evidence, and decide what data or information to support the ideas (Pithers& Rebecca, 2000).

Students appeared to develop sound moral reasoning skills to reach the higher stages of moral development. They carefully examined his/her own values and begin to examine them from another's point of view. Students not only saw that there were different views about what was right or wrong, but that students could make moral judgement from the discussion. Finally agreement was achieved by group members, based on their own set of values, to protect the natural environment and the well-being of future generations. At this stage, students appeared to derive the term of *sustainable development,* which means development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Conference Environment and Development, 1987). This result is consistent with the view of Murdoch (2007) who noted that role play permits learners to consider the values and attitudes that underpin people's responses to the environment and, in so doing, clarify their own values.

Results presented in Role Play Evaluation Form showed a highly productive learning session had been held during the role play. Students indicated that semi-scripted role play made them to stay on task, encourage and fully explore ideas, and achieve genuine agreement and support during the group interaction.

Conclusion and Implications

Trying a semi-scripted role play to engage students in a process of active learning had helped the researcher to address the concern about teaching in STS. This action research aimed to investigate if there would be a difference in the way students engaged themselves in a semi-scripted and non-scripted role play. The semi-scripted role play did help the students escape the trap of blank slates and to put themselves into a person's shoes. Students got to feel for the character they were playing and understood what the perspectives of other characters were. Semi-scripted role play gave students authentic experience in the process of making important decisions about the environment. Students generally felt 'ownership' of the activity. The provision of guiding information via semi-scripts, somehow made students feel empowered to express, share, argue and negotiate more comfortably and confidently than they were in non-scripted role play. Students became better equipped to critical thinking. The role play had helped create an engaging learning experience among the students that researcher will certainly continue to use it in the STS lesson for the coming semester.

There are some things will be improved if this semi-scripted role play is repeated in future lesson. For example, the discussion hours will be extended to 90 minutes. This is to make sure that students could use the time effectively in exploring the issue. Students will be given chance to self-select their own group members as their group players. Students will be assigned to look into local environmental issues. For example, exploring the issue of rain forest destruction in Malaysia could instill concern for the local environment, and to have students understand their role and responsibility in disseminating environmental messages to the community. The second loop of action research will look into those issues to further improve the teaching and learning in STS using semi-scripted role play.

On the whole, a highly beneficial learning experience was gained from the semi-scripted role play. It was worried at the beginning whether the semi-scripted role play would provide students an engaging learning experience, and how productive trainee engagement in the role play would be. It was surprised at how well the semi-scripted role play carried out, and how much more it taught the researcher about the metaphor of the 'classroom as learning place'.

Better learning would occur in the classroom if students were empowered to articulate ideas and process information in ways that were meaningful to them. This experience helped improve the teaching skills and enable the researcher as an educator to provide a better STS learning for the next cohort of students.

Limitations

A limitation inherent to this action research is the situated nature of the study to a single master student's classroom. The data that was collected and analyzed here is specific to these 26 students and may not generalize to the population of in-service master students in Science Education. A further limitation in this study is noted in the lack of student interviews as a data source to support the results.

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APPENDIX A

Role Play Evaluation Form

Rate the extent to which your group performed in the semi-scripted role play by giving comments on the alternatives which you think would best represent it.

How productive we were	Alternatives	Comment
Effective use of time	Much time spent without purpose	
	Got off track frequently	
	Did well, once we got our ideas clear	
	No wasted effort – stayed on target	
Development of ideas	Little done to generate ideas	
	Ideas were imposed on the group by a few	
	Friendly session but not creative	
	Ideas were encouraged and fully explored	
Ability to decide issues	Poor resolution of difference	
	Let one person rule	
	Made compromises to get the job done	
	Genuine agreement and support	
Overall productivity	Did not accomplish our goal	
	Barely accomplish the job	
	Just did what had to	
	Held a highly productive session	

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SHOW-CASING INDICATORS TO A CHANGING ORGANIZATIONAL CULTURE THROUGH THE DEVELOPMENT OF AN INTEGRATED ELEARNING MODEL: INDICATIONS OF A CHANGING ORGANISATIONAL CULTURE AT THE UNIVERSITY OF THE WESTERN CAPE (UWC)

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Abstract

The adoption of technology to enhance teaching and learning in Higher Education Institutions (HEIs) has resulted in institutions having to contend with dynamic changes emanating from the increasing demands to change and improve upon the traditional modes of instruction. This has put pressure on HEIs to implement organisational cultural changes as they seek to incorporate technology in their teaching and learning discourses. The place of models within the education discourse has been more pronounced in recent years in response to the increasing call for practitioners to deliver quality education. The principal thrust of this paper therefore is to highlight the main developmental phases towards the creation of an integrated eLearning model as it seeks to influence organisational cultural change within a case-study of HEI learning environment at the University of the Western Cape for the period September 2005 – October 2011. It is a challenge to move an organisation, particularly a large organisation, and if there isn't a sense of common direction, one will find a lack of focus (Claret, 2006, p.2). Strategic plans are often associated with transitions in leadership or the attainment of certain milestones (Claret, 2006, p.3). This has been an accumulative exercise at the start of the E-learning Awareness Campaign. Accordingly the replication of such a model would also enhance exchange of ideas as HE practitioners continuously seek to improve the success rate of eLearning implementation.

Key words*: eLearning, ePedagogy, indicators, integrated model, organisational culture*.

Introduction

In its broadest sense, eLearning is the use of any electronic technology to facilitate student learning, such as wikis (Lamb, 2004:11), mobile technologies (Naismith, Lonsdale, Vavoula & Sharples, 2004, p.55) and gaming (Kirriemuir & McFarlane, 2004, p.41). However, when higher education institutions refer to the adoption of eLearning, they are generally referring to making existing course content available online, involving asynchronous activities – students access material in their own time and interact with teachers or other students while doing so (Bromham & Oprandi, 2006,p.21).

eLearning is a topical trend but the fundamental pedagogical principles have not been incorporated (Bixler & Spotts, 2000 in Govindasamy, 2002, p.289). There is lack of teaching and guiding principles for designing and developing pedagogical sound eLearning material (Alonso; Lopez; Manrique & Vines, 2005, p.218). The online creation model (figure 1) highlights the need for ePedagogy training and support in a growing eLearning environment, highlighting a viable instructional design process that should be followed carefully to ensure adherence to a pedagogically sound teaching-and-learning methodology. eLearning adoption is approached from the information systems acceptance point of view and this suggests that a prior condition for learning effectively using eLearning systems is that students must actually use them (Abbad; Morris, & de Nahlik, 2009, p.1). Thus, a greater knowledge of the factors that affect IT adoption and their interrelationships is a pre-cursor to a better understanding of student acceptance of eLearning systems, which in turn helps and guides those who develop, implement, and deliver eLearning systems (Carswell & Venkatesh, 2002, p.477).

eLearning should only be adopted where it will substantially add to student experience (or significantly reduce costs, in terms of staff time or other resources, without inhibiting student experience (Bromham, & Oprandi, 2006, p.23). To achieve this, eLearning should not simply replace or duplicate existing course material, but act in combination with other teaching methods through a strategy of ‘blended learning’ (Carswell & Venkatesh, 2002, p. 477). An examination of the benefits of different teaching delivery methods can lead to a combination of online and face-to-face teaching methods, in order to get the best of all possible worlds (Lamb, 2004, p.12). An added benefit of this approach is that it lends itself to a diversity of learning styles, and allows students to benefit from a multi-faceted education (Carman, 2002; Murphy, 2003; Young, 2002). In particular, eLearning tools have the potential to encourage student-directed learning (Abbad; Morris & de Nahlik, 2009). Unlike a large face-to-face class, online activities generally allow students to undertake tasks at their own pace; in a time and place that suits them. Moreover, interactive eLearning tools provide the means for students to “be in control of their learning experience and should have the capability to modify and abstract their personal learning” (Abbad; Morris & de Nahlik, 2009).

Higher education reform cannot take place without addressing Information Communication Technology (ICT) issues, which applies to applications in education management and administration, and those which provide access to knowledge in support of teaching, research, and lifelong learning (Nwuke, 2001). The transformation of higher education institutions (HEIs) in response to a wave of education sector reforms is integrally related to the promise of ICTs in teaching, research, and learning (Adam, 2003).This article highlights the importance of integrated curriculum design in order for eLearning to become an integral part of the teaching-and-learning curriculum across all programmes of the institution. A viable integrated eLearning model that encompasses people development processes and organisational issues is developed and presented. There is also need to establish the role of models in education.

The Role of Models in Education

Models help to expose teachers and learners to the practicalities of teaching and learning. Models are important in scientific research both in formulating hypotheses to be tested and in describing scientific phenomena (Gilbert, 1995). Models also present an alternative way of looking at and undertaking learning tasks. At present, models and modelling are considered integral parts of scientific literacy (Gilbert & Boulter 1998; Gilbert, 1991; Gilbert, 1993; Linn & Muilenberg 1996; Perkins 1986). With the recognised importance of models in science education come the need for a theory of model-based learning and teaching. Consequently, the value of models and modelling to traditional scientific research has been well documented (Black, 1962). Gilbert (1993) defines a model as a simplified representation of a system, which concentrates attention on specific aspects of the system. Moreover, models enable aspects of the system, i.e., objects, events, or ideas which are either complex, or on a different scale to that which is normally perceived, or abstract to be rendered either visible or more readily visible (Gilbert, 1995). Applied in the education sector, model-based teaching is any implementation that brings together information resources, learning activities, and instructional strategies intended to facilitate mental model-building both in individuals and among groups of learners.

Contextualisation (Organisational Culture)

The objective of coming up with the E-Learning Development and Support Unit (EDSU) at the University of the Western Cape (UWC) in 2005 was to drive the 'eLearning awareness campaign' recognising the importance of UWC staff perceptions of the Open Source eLearning system, which was seen as an 'experimental, second-grade system' that had not been quality assured. The institutional reality facing EDSU at that time was marketing and driving eLearning within a resistant environment where there was a strong sponsorship for Free and Open Source Software (FOSS). Lecturer resistance to the adoption of eLearning partly arose from their association of eLearning with the Marks Administration System (MAS) which had been built into the eLearning system; and from their perspective the platform had not delivered in the past. This home-grown, integrated eLearning and MAS platform was referred to as the 'old KEWL' (Knowledge Environment for Web-based Learning) system. Interestingly, this is supported by the Organisation of Economic Co-operation and Development (OECD)'s report (2005) on ICT in tertiary education which found out that "ICT has penetrated tertiary education, but has had more impact on administrative services (e.g. admissions, registration, fee payment, purchasing)" than on the pedagogic fundamentals of the classroom" (OECD, 2005).

Resistance probably had deeper roots, however. White (2007) suggests that because higher education institutions (HEIs) are resistant to change, educational technology in universities has not managed to match the ubiquity of technology in everyday life. Moreover, eLearning brings about considerable change and reorganisation in the institution, a "disturbance of the status quo, a threat to people's vested interests in their jobs, and an upset to the established way of doing things" (Kotter & Schelesinger, 2008, p.130).

Methodology of Research

The methodology for this paper involving data collection instruments, processes and participants is provided in the Appendix section at the end of this paper. The data collection process was undertaken in 3 phases (see Appendix below). Primarily interviews and questionnaires were used in the data collection process for the subsequent development of an *Integrated eLearning model* which was undertaken in three phases as indicated in each phase below. A cumulative total of 971 participants were purposively targeted for all the phases, of which 563 responded. The participants were drawn from various stakeholder groups from all sections of the university population in order to attend some level of validity. Hence the target groups included academics; eLearning and IT support staff, institutional leaders and students within the University of the Western Cape (UWC). Additionally, eLearning experts and consultants in other HEIs in South Africa were also incorporated into the research. All these cited participants were either interviewed or presented with questionnaires to ascertain their level of understanding and preparedness of eLearning implementation; as well as the role of eLearning in enhancing teaching and learning in Higher Education. Below is a synopsis of the instruments, procedures and processes involved in the data collection process is given as follows:

Questionnaires

Phase 1 involved an exploration of relevant literature on factors affecting the adoption of technology in teaching and learning. In **phase 2** an email questionnaire survey was administered and was targeted at a total sample of 144 lecturers of which 31 responded. In addition, stakeholder interviews (see stakeholder group below) were conducted and these were targeted at 51 participants of which 39 responded.

Interviews

In phase 3 a cumulative total of 560 academics and students were interviewed. Of these, 42 academics and 429 students responded, giving a total of 471 cumulative responses. Academics are in a position to 'make or break' any eLearning initiatives, which inevitably impact on the successful implementation of eLearning, hence their incorporation into the research. The researcher sought to determine the attitudes and mindsets of the academics regarding eLearning implementation to supplement their teaching methods.

Sample and Sampling Procedures

An inclusive sample across the campus community was purposively adopted and involved various players (herein referred to as stakeholders) mandated with the implementation of eLearning in teaching and learning at institutional level. The participants were purposively selected to provide an insight into factors that influence the adoption of eLearning. Various stakeholders that were targeted included *institutional leaders* as institutional policy formulators on the most appropriate mode of instruction within the institution; *IT back-end support staff and eLearning system developers* as drivers of sustainable infrastructural development and back-up support. The developers had been credited for the development of the institution's home-grown eLearning system under the auspices of the Free Software Innovation Unit (FSIU) of the institution. Additionally *eLearning support staff (front-end* were also included among the sample of participants in the study as the key-drivers of eLearning in the institution, especially given their hands-on experience in the engagement and communication with institutional academics.

The academics were incorporated as participants to the study, taking cognisant of the fact that they have access to the students who are at the core of teaching and learning in the institution. In sampling from this group the researcher sought to determine the attitudes and mindsets of the academics regarding eLearning implementation to supplement their teaching methods. At the time of the deployment of this study, eLearning has not been a mandatory means of teaching in the institution, thus the academics would still be in a position of 'power', especially in terms of students only having access to the Learning Management System (LMS) and its eTools when the lecturer/academic decides to engage in any eLearning initiatives. To complement the sample drawn from the institution, the researcher sought a diversified opinion by incorporating participants from other HEIs in South Africa, notably *eLearning experts and consultants in other HEIs* in South Africa who are at the forefront of eLearning initiatives at their specific institutions, especially in terms of driving eLearning initiatives for the past ten years; and the use and application of eTools within LMSs, both Open Source and Proprietary systems. Lastly, *students* within the institution across all Faculties were also roped into the study, taking cognisance of the fact that they only have access to online environments if their lecturers have created an online class for a specific discipline and module.

Discussion and development of the creation of an *Integrated eLearning Model*

The creation of an *Integrated eLearning Model* was conducted in three developmental phases, each of which was a progression of and a build-up from the previous one. As a result, below are the three phases which culminated in the creation of the *Integrated eLearning Model* (Figure 3).

Phase 1: Development of the Online Course Creation Model

This developmental phase was initiated in September 2005 and was a highlight of the establishment of the E-Learning Development and Support Unit (EDSU) as an illustration of organisational change to support eLearning across the whole university characterised by limited resources and insufficient human capacity. The establishment of an integrated eLearning support unit is indicative of the provision of a "blue print for designing organisations, fitting the pieces of the organisation together to guide the behaviour of the people - often large numbers of people - toward the accomplishment of the organisation's objectives" (Bradach, 1996, p.1).

This phase was mostly theory grounded drawing from relevant literature and the institutional eLearning strategy document. A strategic plan identifies the strengths and weaknesses, while providing a road map as to where an organisation is going (Moody, 2009). This phase led to the development of an initial eLearning model; namely an *Online Course Creation* (see figure 1) model which entailed a blended ePedagogy training approach for lecturers (and tutors) to empower them to take control and ownership of their eLearning experiences, as well as enhance their computer literacy skills. This is in line with White's (2007, p. 844) argument that public awareness is vital to fostering community ownership.

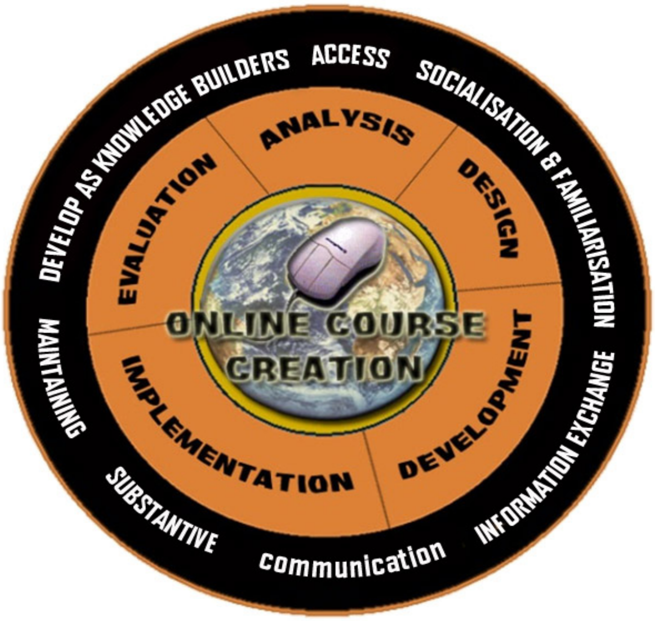


Figure 1: Online Course creation (Stoltenkamp, 2007).

The model, Figure 1 above, presents the five stages of the generic Instructional Design (ADDIE) model, coinciding and linking with the stages deliberated by the work of Salmon (2004) regarding online teaching-and-learning (e-moderation). Moreover, the model highlights the vital commitment of an integrated support structure, whereby the lecturer/facilitator/emoderator/tutor and eLearning support team jointly take ownership of the implementation of interactive online course creation.

Phase 2: Development of the Online Course Creation Model

Phase 2 was a build-up of the previous phase and highlighted an e-learning implementation beyond the focus of the delivery of training programmes; with emphasis on an awareness campaign that would familiarise educators with the eLearning support team; the various communication, content creation and assessment eTools; and their pedagogical value.

Questionnaires were sent out to and interviews conducted with stakeholder groups (refer to Appendix). Responses from these groups were identified which showed that eLearning implementation in a complex higher education domain, in goes beyond just focusing on ePedagogy applied to effective online course creation. This led to the development of a revised eLearning Model, which is an improvement and inclusion of the initial eLearning model. Hence a revised *Infused ePedagogy model* (see figure 2 below) was developed based on findings from phase 1 and responses from phase 2.

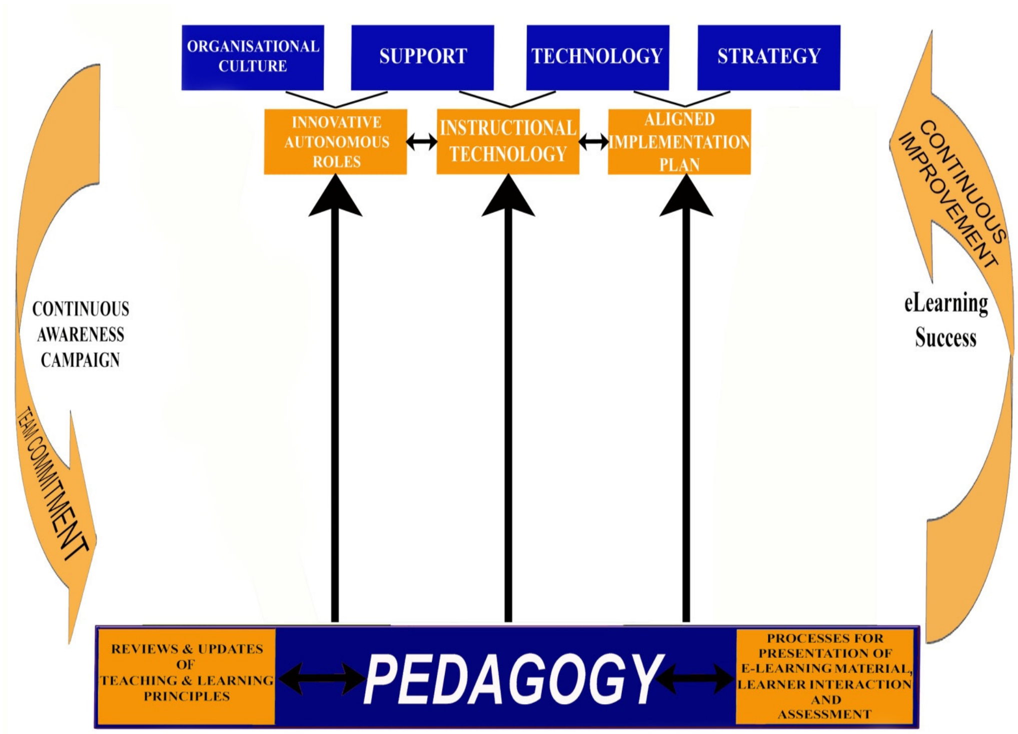

ORGANISATIONAL CULTURE
SUPPORT
TECHNOLOGY
STRATEGY
INNOVATIVE AUTONOMOUS ROLES
INSTRUCTIONAL TECHNOLOGY
ALIGNED IMPLEMENTATION PLAN
CONTINUOUS AWARENESS CAMPAIGN
TEAM COMMITMENT
CONTINUOUS IMPROVEMENT
eLearning Success
REVIEWS & UPDATES OF TEACHING & LEARNING PRINCIPLES
PEDAGOGY
PROCESSES FOR PRESENTATION OF E-LEARNING MATERIAL, LEARNER INTERACTION AND ASSESSMENT

Figure 2: An Infused ePedagogy model.

‘Good teaching-and-learning’ principles are fundamental for successful eLearning adoption and implementation. Most pedagogical principles of the traditional classroom pertain to eLearning, but these however have to be comprehensive to adapt and advise for the quick technological changes (Govindasamy, 2002, p.288). There is a need for all-inclusive, infused approaches which include valuable learning principles based on empirical research and mostly autonomous of the eLearning programme (Bixler & Spotts, 2000).

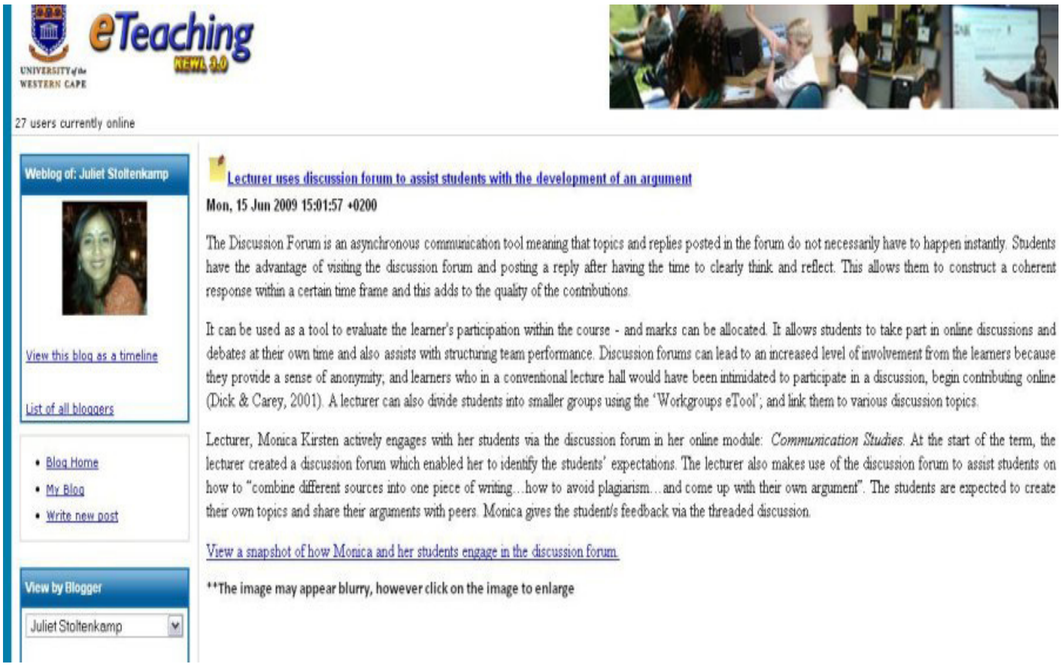
Phase 3: Development of the *Integrated eLearning Model*

Phase 2 opened up further gaps as expressed by lecturers and students in their responses to questionnaires and interviews, as discussed in the derived themes below:

- Lecturer's involvement; need for enhanced ePedagogy skills and incentives;
- Increasing blended eLearning practices; and attainment of skills/eSkills in other areas related to their expertise;
- Change in eLearning discourse by academics during colloquiums
- Innovative marketing eLearning practices to enhance buy-in;
- Online communities of practices in an ever-changing 'borderless world';
- Accessibility and information skills;
- Sustainability approaches of eLearning support unit/s;
- Responsibility to evolving organic processes; eLearning team, lecturer and tutors engage in joint action research;
- Quality assurance: eLearning alignment to QA systems for the development of best practices.

Lecturers have engaged in more pro-active innovative roles within the institution thereby providing evidence of increased interaction with innovative eTools such as podcasts. There is an increased positive attitude to the adoption of eLearning by academics most of whom who have expressed the need for more ePedagogy as part of staff development self-enrichment. Some academics have supported the idea of rewarding online practices; with others having expressed the notion that what is important is not personal reward, rather for the betterment of both the lecturer and the students. Despite the unstable institutional eLearning platform, increasing numbers of lecturers have voluntarily contacted the eLearning support to assist them with the adoption of eLearning practices to enhance their face-to-face instruction, due to the effective change management strategies; especially regarding a support structure for two versions of the home-grown open source eLearning system. This enabled users to seamlessly migrate from one version to another, with the older version serving as a back-up system when crashes occurred in the newer version of the eLearning platform.

Public platform such as an annual eLearning colloquium has provided an opportunity for lecturers to share challenges and experiences related to the adoption of eLearning. This has resulted in change of discourse whereby lecturers focus more on discussions related to the ownership of online environment; and online teaching and learning practices rather that the actual open source system. Making use of the blog tool for an internal communication and marketing strategy also exposes the institution's practices to the global village- as the blog tool is an internet based communication tool where visitors are encouraged to share their best practices; respond and comment on the blogs, an example of which is cited below.


eTeaching
KEWL 3.0
UNIVERSITY of the WESTERN CAPE
27 users currently online
Weblog of: Juliet Stoltenkamp
View this blog as a timeline
List of all bloggers
Blog Home
My Blog
Write new post
View by Blogger
Juliet Stoltenkamp

Lecturer uses discussion forum to assist students with the development of an argument

Mon, 15 Jun 2009 15:01:57 +0200

The Discussion Forum is an asynchronous communication tool meaning that topics and replies posted in the forum do not necessarily have to happen instantly. Students have the advantage of visiting the discussion forum and posting a reply after having the time to clearly think and reflect. This allows them to construct a coherent response within a certain time frame and this adds to the quality of the contributions.

It can be used as a tool to evaluate the learner's participation within the course - and marks can be allocated. It allows students to take part in online discussions and debates at their own time and also assists with structuring team performance. Discussion forums can lead to an increased level of involvement from the learners because they provide a sense of anonymity; and learners who in a conventional lecture hall would have been intimidated to participate in a discussion, begin contributing online (Dick & Carey, 2001). A lecturer can also divide students into smaller groups using the 'Workgroups eTool'; and link them to various discussion topics.

Lecturer, Monica Kirsten actively engages with her students via the discussion forum in her online module: *Communication Studies*. At the start of the term, the lecturer created a discussion forum which enabled her to identify the students' expectations. The lecturer also makes use of the discussion forum to assist students on how to "combine different sources into one piece of writing…how to avoid plagiarism…and come up with their own argument". The students are expected to create their own topics and share their arguments with peers. Monica gives the student/s feedback via the threaded discussion.

View a snapshot of how Monica and her students engage in the discussion forum.

**The image may appear blurry, however click on the image to enlarge

Figure 3: **Example of a marketing blog sent out to campus and global communities.**

The blog has been presented herein as an example of an eTool that enabled users to cross communication boundaries through online collaborative projects which enables them to reach out to communities in other countries by engaging in discussion forums; and other online communication and assessment tools meant to strengthen intellectual life of students and staff and to contribute to the integration into global community of practice. In addition to the big appeal for computers and computer-labs, accessibility goes beyond these to include necessary logistical support; as well as appropriate training for new technological innovations, that seemingly would make their work a lot easier; and supplement their existing teaching-and-learning practices. In response to changing needs the team has transformed to include other responsibilities, such as engaging in research in niche and innovative areas. This has changed the public perception of the unit which initially was regarded as only limited to providing training, but has shown that it holds capacity to engage in research (single or joint) projects in areas such as: implementation; eTools; ePedagogy; support and training; as well as publication through-put.

UWC has made collaborative efforts with other institutions with the African Virtual Open Initiative and Resources (AVOIR) Network, involving several higher education institutions– whereby developers across sixteen (16) institutions in Africa; North America, Europe and Kabul, Afghanistan contribute to the development of the software. Despite this network the UWC community did not perceive the home-grown Open Source Learning Management System (LMS) as part of a community of practice; hence they only alluded to the need of a stable system.

The issue of quality assurance has not been addressed adequately as participants did not view their eLearning efforts and practices as making a positive contribution to the broader HE education system which will enable the institution to apply methodologies and guidelines for the development of eLearning best practices in the institution.

Evidence of serious bugs in an unstable home-grown open source platform has presented challenges towards the institution's efforts to market the eLearning system confidently to the users; especially the frustrated users within the institution. Reports on unstable home-grown eLearning system between (2000- 2011) and other infrastructural network and load issues add to the challenges faced hence the repeated appeals to the developers by the eLearning team, for a stable eLearning system.

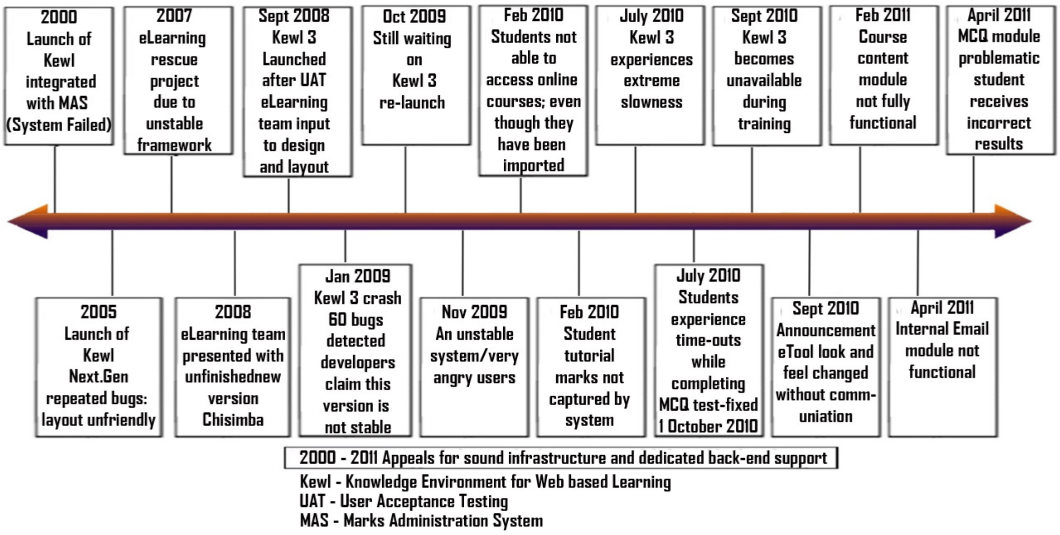

2000 Launch of Kewl integrated with MAS (System Failed)
2007 eLearning rescue project due to unstable framework
Sept 2008 Kewl 3 Launched after UAT eLearning team input to design and layout
Oct 2009 Still waiting on Kewl 3 re-launch
Feb 2010 Students not able to access online courses; even though they have been imported
July 2010 Kewl 3 experiences extreme slowness
Sept 2010 Kewl 3 becomes unavailable during training
Feb 2011 Course content module not fully functional
April 2011 MCQ module problematic student receives incorrect results
2005 Launch of Kewl Next.Gen repeated bugs: layout unfriendly
2008 eLearning team presented with unfinishednew version Chisimba
Jan 2009 Kewl 3 crash 60 bugs detected developers claim this version is not stable
Nov 2009 An unstable system/very angry users
Feb 2010 Student tutorial marks not captured by system
July 2010 Students experience time-outs while completing MCQ test-fixed 1 October 2010
Sept 2010 Announcement eTool look and feel changed without comm-uniation
April 2011 Internal Email module not functional
2000 - 2011 Appeals for sound infrastructure and dedicated back-end support
Kewl - Knowledge Environment for Web based Learning
UAT - User Acceptance Testing
MAS - Marks Administration System

Figure 4: Appeals for sound infrastructure and dedicated back-end support.

This continuum (time-line) does not present a critique of the open source platform, KEWL - but rather aims to outline amongst other things the significance of enabling mechanisms for sound ICT infrastructure and back-end support processes which a front-end support unit extensively depends on.

It was found that the themes address important factors which contribute to the successful implementation of eLearning. The main developmental stages towards the creation of a revised *integrated eLearning model* and how this had influenced organisational cultural change within a HE learning environment have been highlighted. A final *integrated eLearning model* was developed based on the processes deliberated in the previous phases involving; literature review; qualitative data retrieved from interviews and questionnaires; and supporting quantitative data retrieved from the actual case-study, eLearning adoption at the University of the Western Cape.

Statistical strides that show increased buy-in in the adoption of eLearning within the campus community. A cumulative total of 831 face-to-face interactions with lecturers seeking advice on the usage of eTools to supplement their teaching and learning practices (from 2005 to 2011); as well as a staggering 18517 student consultations during the same period were administered, with an average of 1544 per annum. This is a significant increase in the number of students seeking support from the eLearning Support team.

The usage of specific eTools by lecturers for teaching-and-learning practices reflects an increased preference for the content development tools. However, despite the eLearning team's continuous awareness of the discussion forum as a sound communication and assessment tool, a decrease in usage is reflected. Lecturers are engaged in the teaching of large classes and feel daunted by the administration and monitoring of the discussion topics. Hence they express the need for online tutor assistance.

There is evidence of an increased appreciation of the need to apply ePedagogy and increased adoption. As academics become more familiar and comfortable with the eTools they are able to focus more on ePedagogy. Observations are indicative of the need to have access to training in order for them to become familiar with eTools and apply it effectively and at UWC they are closely supported by the Instructional Design team. This is further related to observations of increasing student support in terms of computer literacy and eTools aligned to the institutional eLearning strategy document – which highlights the need for the students to have the necessary *skills, attitudes and resources* in order for them to become self-directed learners.

Research Outcomes

The process of developing the model has been informed by observing and reflection on the factors which contribute to eLearning adoption and organisational change, having been in the implementation environment and having driven the eLearning awareness campaign at UWC since 2005. The *integrated eLearning model* (see figure 5 below) is a fusion of literature review, qualitative data from interviews and questionnaires and supporting quantitative data from the actual case-study (eLearning adoption at UWC). This model seeks to depict the important factors which contribute to eLearning implementation in a complex higher education setting.

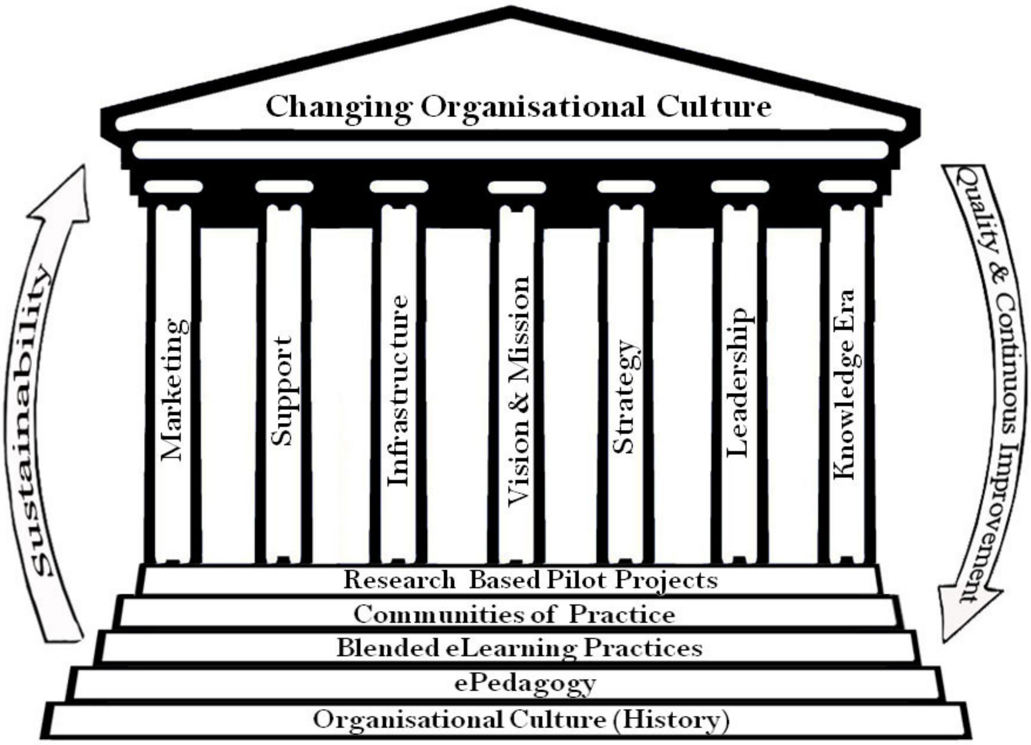

Changing Organisational Culture
Sustainability
Marketing
Support
Infrastructure
Vision & Mission
Strategy
Leadership
Knowledge Era
Quality & Continuous Improvement
Research Based Pilot Projects
Communities of Practice
Blended eLearning Practices
ePedagogy
Organisational Culture (History)

Figure 5: An integrated eLearning model: Indications of a changing organisational culture.

The core business alone is not enough and envisions of this integrated eLearning model suggests, that a robust, useful and creative planning contributes to the system on a national and international level (Badat, 2004, p.41).

Some of the key factors that impact and contribute to effective eLearning implementation and have been experienced in UWC include:

- provision of access to holistic online activities- successful online application, successful registration, and successful access (log-in) to the eLearning system (*support, infrastructure, sustainability*);
- integrated institutional ICT infrastructure and systems with dedicated front-end and back-end support capacity and processes; enabling the development of pedagogically sound, interactive online courses which can be accessed at any time and from any geographical space (*ePedagogy, support, infrastructure*);
- communities of practice (COPs) which are replicated in the institution and between collaborative partners outside the institution (*COPs, research based pilot projects*);
- attempts by the institution to contribute and position itself favourably in the global and knowledge society (*knowledge era, vision and mission, COPs*);
- quality assured, reviewed and up-to-date improved change management strategies and pedagogical approaches to the way in which eLearning practices are presented to user-groups (institutional leaders; eLearning decision-makers; lecturers; students; tutors; eLearning support staff); and learners are assessed and interact (*quality assurance and continuous improvement; strategy, ePedagogy, leadership*);
- effective change management and marketing strategies and approaches which further enable effective communities of practices (*marketing, COPs*); and moreover the
- integrated professional leadership, management and support of the components of the eLearning model which will ensure that the institution has a shared vision and a structured implementation approach to eLearning policy design and development; and implementation (*leadership, vision and mission, strategy*).

These characteristics enable the institution to engage and market itself with confidence, in terms of its Mission, as a national university, alert to its African and international context as it *strives to meets its vision.* The integrated eLearning model intends to build on accomplished initiatives for mission achievement by *nurturing well-educated and dynamic citizens who are able to cope in an ever-changing global society*.

Additionally, the author reiterates the cyclic presentation of the model (as in phase 2) and indicates the importance of the realisation that ‘eLearning success’ can never be claimed, but must rather be perceived in terms of a team commitment to continuous support, process and awareness to learners. In this case, the learners are the lecturers, student and support functions as ‘learners on a life-long learning journey’, and in particular an eLearning journey.

In particular, this integrated eLearning model intends to guide HEIs that seek to embark on implementing eLearning; specifically those who endeavour to make use of open source eLearning systems; and for those who have already implemented, to possibly assess their progress and the quality of their eLearning initiatives; as well as challenges that may have been encountered or are being encountered. Hence, the discussions also reflect on lecturer, student support issues and the barriers that an eLearning support unit must grapple with when implementing eLearning.

Furthermore, the model also touches on change management and marketing strategies for the successful implementation of eLearning in a HE context. It is also intended that this *integrated eLearning model* may perform an educational role in future eLearning implementation planning in HE contexts; as well as contribute to the emerging body of knowledge, in terms of eLearning implementation in a developing country. Moreover, it highlights the indications of life-long organisational cultural changes due to an ever-growing eLearning community.

The development of an *integrated eLearning Model* has been a difficult task and Badat (2004,p.47) concurs “*that policy development, planning and implementation is a complex task* *which is linked to the wider social objectives, apprehensions and struggles*". The situation today remains as "the national system comes under pressure for more and better higher education, a differentiation is highly probable in which there will be a residual market for private sectors… and when the public sector is not providing either the more or the better, government officials as well as multitudes of consumers are likely to support those institutions, new and old, that compete in the residual market" (Clarke, 1983, p.167).

Conclusion

Educational technology has positively impacted on prevailing communities of practice and has even led to sound practices such as sharing online courses/modules with the global community. The escalating numbers of students seeking higher education facilities has been supported by a multi-modal delivery approach. The integrated eLearning model presented as a measuring tool has aligned itself to current quality assurance systems of the government which enables academics to apply methodologies and guidelines for the development of best practices in HEIs. The cyclic presentation of the eLearning model highlights that eLearning success' can never be claimed but rather can be perceived as team work committed to continuous process and awareness. This has inherently impacted on the organisational cultural changes which have shown that in HEIs, organisational cultural change is a process and not a one-off event as it entails the difficult task of changing mindsets toward the use of new pedagogies to supplement traditional instruction. The report highlighted various factors which contribute to the successful implementation of eLearning, including peoples' perceptions at different times of the eLearning continuum.

This paper has reflected on the exponential growth of eLearning; improved attitudes and mindsets; strategic commitment for the infusion of technology and ePedagogy; and the institutional teaching and learning strategy. On the other hand, these results are in great contrast to the repeated launches and crashes of a home-grown eLearning system, linked to the lack of management of the development of the home-grown Open Source platform, often hindering online teaching and learning initiatives and support processes. Additionally the research has reflected on repeated unstable launches and crashes of various versions of the institutional learning management platform, indicative of a lack of version control management by the developers of the system; and moreover as highlighted previously, the call on the ground for the abandonment of this system. Hence, in 2012 the leaders of the institution will have to make some serious decisions due to the looming paradox which cannot be ignored in order for eLearning to grow to the next level at the University of the Western Cape.

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Appendix: Data Collection Instruments, Procedures and Participants used in the research.

Table. Overall design of the longitudinal study, September 2005 – October 2011.

OVERALL DESIGN				
Level	**Qualitative Methods**	**Sample Target and no. of responses**	**Supporting Quantitative Measures**	**Development of an eLearning model**
PHASE 1: An eLearning awareness campaign Sept 2005-Dec 2006	▪ Literature review ▪ eLearning strategy document	▪ Document analysis: eLearning Institutional Strategy	▪ Number of lecturers and students who received eLearning training ▪ Number of courses online	The development of an *Online Course Creation Model* focusing on pedagogy and instructional design
PHASE 2: Implementation beyond the focus on ePedagogy Jan 2007-August 2008	▪ Literature review ▪ Email questionnaire ▪ Interviews Stakeholder groups: -Semi-structured individual interviews -Focus group interview	▪ Email Questionnaire: -Sample target=144 -Responses=31 ▪ Stakeholder Interviews: -Sample target= 51 -Responses=39	▪ Number of lecturers and students who received eLearning training ▪ Number of courses online	The development of a revised *Infused ePedagogy Model* reflecting implementation beyond ePedagogy
PHASE 3: Indications of a changing organisational culture September 2008- October 2011	▪ Literature Review ▪ Semi-structured questionnaire: - Delivered through face-to-face individual interviews; - and electronically ▪ eLearning blog	▪ Sample target: Academic Interviews, September 2008 = 110 ▪ Responses= 22 ▪ Sample target: 106 Academics and 560 students: Interviews, September 2011 ▪ Responses=42 Academics; ▪ Responses= 429 students ▪ eLearning blogs analysed = number = 75	▪ Voluntary number of eLearning users (academics); ▪ Number of courses online	The development of an *Integrated eLearning Model* focusing on the integrated factors which impact successful eLearning implementation

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PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
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GENDER DIFFERENCES IN TEACHERS' BELIEFS AND PRIMARY SCHOOL CHILDREN'S ACHIEVEMENT IN MATHEMATICS

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Abstract

The main purpose of this study was to examine differences in male and female teachers' beliefs about their math instruction, and the relationship between boys and girls math achievement and teachers' beliefs. The samples were primary mathematics teachers (N=521) and Year 2 and Year 3 students (N=9980) from 127 schools. A questionnaire was used to examine primary math teachers' goal structure for students, approaches to instruction, and personal teaching efficacy. Students' math achievement was assessed by national diagnostic math tests. The teachers were generally oriented towards mastery goals and mastery approaches to instruction, and reported high personal teaching efficacy. However, female teachers report somewhat higher levels of mastery goal structure for students and mastery approaches to instruction, while male teachers report a somewhat higher level of performance approaches to instruction. Positive relations between students' math performance and teachers' mastery orientation, mastery approaches to instruction, and teaching efficacy were also found. These relationships were somewhat stronger for girls than for boys. In conclusion, the relationship between teachers' beliefs and students' performance were different for male and female teachers, respectively. In future studies qualitative research methods should be included.

Key words: *mathematics achievement; primary school; teachers' beliefs.*

Introduction

Background

An extensive body of research on gender differences in mathematics has been dealing with student mathematics learning. Less attention has been paid to gender differences in teachers' beliefs, the relationship between teacher beliefs and gender, and male and female students' math performance. It is widely agreed that teachers are among the most, if not the most significant factors in students' learning (Cochran-Smith & Zeichner, 2005). In the study of gender issues it appears that teachers' beliefs are an important variable. According to Fennema (1990), insights into teachers' beliefs may lead to deeper understanding of gender differences in mathematics. For example, male and female teachers may hold different beliefs about students' math learning. This may have effect on their instructional practices, which in turn can affect students' beliefs and math achievement. Differences in teachers' instructional approaches may also have differential effects on male and female students, respectively. It is also a question whether the combined effect of teacher beliefs and gender may influence girls' and boys' math learning differently.

In a recent study based on classroom observations in Norwegian schools (Years 3, 6, and 9), no differences were registered in male and female teachers' organization of instruction in different subject domains, including mathematics (Haug, 2010). However, teachers' beliefs related to students' learning and development have obtained little attention (Buehl & Alexander, 2009). The present study uses goal orientation theory for examining gender differences in teachers' beliefs about their instruction in mathematics, the relationship between teacher beliefs and gender, and student math achievement and gender (the term "gender" rather than the term "sex" is used through out the article, with gender referring to biological sex). Many researchers assume that school children show the most positive motivation and learning patterns when their classroom setting emphasize mastery, understanding, and improving skills and knowledge (Meece, Anderman & Anderman, 2006). In contrast, when classroom environments focus on demonstrating high competence, research suggests that under these conditions many students experience a decrease in motivation. From a goal orientation perspective teachers' beliefs and instructional practices are assumed to influence students' goal orientations.

Goal orientation theories focus students' intentions or reasons for engaging, choosing, and persisting at different learning activities, and were developed to explain students' learning and performance on academic tasks (Schunk, Pintrich & Meece, 2008). According to Ames (1992, p. 261), goal orientation represents an integrated pattern of beliefs that leads to "different ways of approaching, engaging in, and responding to achievement situations". The goal orientation research has suggested that there are two general goal orientations concerning the reasons students are pursuing when approaching and engaging in a task. Students can adopt a mastery goal orientation or a performance goal orientation (Ames, 1992; Anderman & Midgley, 2002; Maehr & Zusho, 2009; Schunk et al., 2008). Students, who adopt a *mastery goal orientation*, focus on learning, developing new skills, and to improve their competence. It is important for them to gain understanding or insight, and success is evaluated in terms of self-improvement. In contrast, a *performance goal orientation* represents a focus on demonstrating high ability relative to others, trying to outperform other students, and seeking public recognition of one's performance. Success is evaluated from doing better than others. It is assumed that mastery goal orientations are positively related to a number of motivational and cognitive processes and behaviour outcomes (Ames, 1992; Malmberg, 2008; Meece, 1994; Pintrich & De Groot, 1990; Wolters, Yu & Pintrich, 1996). In contrast, performance goal orientations are assumed to produce negative effects. It appears that having a higher mastery goal orientation and a lower performance orientation results in the best level of motivational and cognitive engagement (Meece & Holt, 1993).

Teacher's Beliefs and Instructional Approaches

Goal orientation theorists argue that students' personal goal orientation is influenced by the teacher's instructional practices in the classroom. The fundamental assumptions behind the research on teachers' beliefs are that teacher behaviours are substantially influenced and even determined by teacher beliefs. These behaviours, in turn, impact upon student beliefs and behaviour (Li, 1999). Teachers may have mastery and performance goals for their students, and that they tend to utilize teaching strategies that match their own motivational orientation and beliefs. In other words, teachers' goal orientations both affect and reflect their instructional practices. Thus, classroom goal structures are generally viewed as precursors of students' personal goal orientation, and it is assumed that teachers through their use of instructional strategies create different goal structures in the classroom. For example, an evaluation practice dominated by social comparison among students can foster a performance orientation in students. Teachers who emphasize performance-oriented practices also tend to point out ability differences, to show the work of the best students as examples for others, and to use competitive instructional methods. On the other hand, focus on individual improvement, and feedback that communicates that mistakes are a part of learning and that effort is important for learning will help students adopt a mastery goal orientation. Teachers who engage in mastery-oriented instructional practices also tend to create learning environments where all students can feel that they succeed and feel a sense of mastery and improvement. Such classrooms emphasize effort, improvement, and challenges (Ames, 1992; Anderman, Eccles, Yoon et al., 2001; Maehr & Zusho, 2009; Schunk et al., 2008). Thus, teachers' instructional practice can be an important contributor to students' adoption of goal orientation.

Research findings show that students' personal goal orientations correspond with their subjective perceptions of the classroom goal structure. For example, Friedel and colleagues examined Year 7 students' perceptions of the achievement goals teachers emphasize for them in mathematics, and the relation of these goals to children's personal goal orientation. Results show that students' perceptions of teacher mastery and performance goal emphasis predicted students' personal goals (Friedel, Cortina, Turner & Midgley, 2007). They also found that children's personal goals mediated the relation between perceived teacher goal emphasis and students' efficacy beliefs. Anderman et al.s (2001) study showed that performance-oriented instructional strategies (e.g., pointing out the work of the best students as examples to others) was related to lower levels of student mastery goal in Years 3, 4, and 6. It also had negative effects on students' valuing of academic subjects. Thus, the goals teachers emphasize through their instruction practices may have important consequences for students' motivation and cognitive processing. However, the expected positive relation between mastery goals and performance has not been consistent (Meece et al., 2006). There may also exist grade level differences in teachers' goal orientation. Anderman et al. (2001) found that teachers of students in higher grade levels reported using performance oriented instructional practices more than did teachers of students in lower grades.

Research on Teacher and Student Gender

Unlike the interest in gender differences in students' math learning and achievement, relatively little focus has been on teacher gender, for example whether it makes a difference for student achievement if a teacher is male or female. So far, no typical pattern can be drawn from the research literature on the effects of teacher gender on students' math achievement (Li, 1999). Another gender-related question is whether boys fare best in classes taught by male teachers, while girls fare best in classes taught by female teachers. In the research literature on the significance of teacher gender on student achievement, two competing models have been used (Martin & Marsh, 2005). The first model can be considered a *gender-stereotypic* model, which suggests that boys do better in classes taught by males and girls do better in classes taught by females. The second model can be considered a *gender-invariant* model which suggests that boys' and girls' achievement does not significantly vary as a function of their teacher's gender. Martin & Marsh (*ibid.*) studied the impact of student gender, teacher gender, and their interaction on academic motivation and engagement for junior and middle high school students (Years 8 and 10) in mathematics classrooms. They found that girls rate their relationships with female teachers better than they rate their relationships with male teachers. They also registered that boys and girls are no more engaged in classes taught by males than they are in classes taught by females, which support the gender-invariant model. Finally they report that boys did not fare any better with male teachers than female teachers. This finding runs counter to the gender-stereotypic model. These findings can, however, not be generalized to younger children. Martin & Marsh conclude that similar research is needed at lower school levels.

Li's (1999) extensive review of the research literature dealing with gender differences indicate that more positive attitudes towards mathematics were demonstrated by female students taught by female teachers. Male students tend to give male teachers higher ratings, while female students favour female teachers. In other words, when a teacher-students gender interaction with respect to student rating of teachers is present, it most often appears to reflect a same-gender preference; i.e. supporting the gender-stereotypic model. Unfortunately detailed information about the age of the students in the different studies is lacking. Concerning the effects of teacher gender on students' mathematics achievement, it seems that no typical pattern can be drawn from the literature since the research findings are inconsistent. Li (*ibid.*) argue that some of the conflicting findings may be due to cultural differences rather than gender differences. Correlation between teacher gender and gender differences in students' math achievement were mostly observed in areas other than Western countries. Gender differences in teacher–student interaction in mathematics classrooms have also been investigated. Li's review shows that teacher–male student interactions are more frequent than teacher–female student interactions. The gender of the teacher does not seem to affect that teachers (both male and female) tend to interact more often with male students. However, one important teacher gender distinction is that female teachers tend to be more student-centred and supportive of students than male teachers. Female teachers also appear to use class discussion more frequently and encourage collaboration. Li conclude that the relationship between gender differences in teachers' beliefs and gender differences in their classroom instructions in mathematics need to be explored.

Aims of the Study and Research Questions

Research in mathematics education exploring issues related to gender differences in teachers' beliefs in mathematics is sparse (Li, 1999). According to Butler & Shibaz (2008) a systematic, theory-driven research on teachers' motivational beliefs is lacking, although the classroom may be considered as an achievement area also for teachers. Goal orientation theory may provide a useful framework for conceptualizing qualitatively differences in teachers' motives for teaching and is highly relevant for understanding teachers' instruction. Thus, in the present study the goal orientation perspective is extended by taking into account teacher and student gender. Male and female teachers may hold different beliefs about math instruction and student learning. Therefore, the first objective for the present study is to investigate primary male and female teachers' perceptions and beliefs about their personal goal structures, approaches to instruction, and personal teaching efficacy in mathematics.

Issues related to teacher gender and student gender in teaching and learning mathematics are also unclear. A second aim is therefore to examine the relation between the three aspects mentioned above (i.e. teachers' achievement goals for students, their approaches to instruction, and their personal teaching efficacy), teacher and student gender, and student achievement. Prior research within the goal orientation framework has primarily been directed towards older students. Thus, there is also a lack of studies focusing on classroom settings with young students. At the early elementary level most students have spent their time in self-contained classrooms with just one teacher or one team of teachers. This creates a unique opportunity to study the relationship between teacher's beliefs and gender and students' achievement and gender. The following research questions will be addressed:

1. Are there differences in how male and female primary math teachers report goal structures for students, approaches to instruction and personal teaching efficacy?
2. Are there empirical relationships between male and female students' math performance and male and female teachers' reported goal structures, approaches to instruction and personal teaching efficacy?

Methodology of Research

Sample

In the present study, all Norwegian primary schools with more than 50 students in average per grade level were invited to submit data. In total, 262 schools were invited to submit student results. In addition, the teachers of mathematics in Year 2 (7 year olds) and Year 3 (8 year olds) were asked to respond to a questionnaire. 127 of the invited schools returned both teacher and student data. Schools not wanting to participate typically stated that they lacked capacity due to participation in other surveys or having to fulfil other administrative tasks. The data was collected in May and June 2009. In total, data from 521 teachers and 9980 students was received, i.e. approximately 4 teachers and 79 students per responding school. 58 percent of the responding teachers teach in Year 2.

In Norway the primary school level consists of Years 1 (6 year olds) to 7 (13 year olds). The primary (and lower-secondary) level is highly comprehensive; there is no explicit streaming of students based on abilities into different schools. Almost all students attend the school which are the nearest to their home. It is neither allowed to have stable groupings within schools based on students' abilities, interests etc. The majority of teachers at the primary level are trained as generalist teachers and are accordingly licensed to teach all subjects in Years 1 to 7.

Instruments and Implementation

Since it is not recommended to administer questionnaire to students in Years 2 and 3, a math test was used as an outcome measure. National diagnostic tests, constructed to measure students' basic numerical understanding, understanding of mathematical operations, and computational skills, were utilized. In the test development process, it was also necessary to construct a theoretical framework which described the competency aims more precisely (Alseth, Throndsen & Turmo, 2008; Alseth, Throndsen & Turmo, 2009). This framework builds on extensive international research, as many studies have been conducted with the aim of describing students' competencies within these areas (e.g. Ahlberg & Hamberg, 1995; Anghileri, 2000; Bobis, Clark, Clark et al., 2005; Carpenter, Fennema, Franke et al., 1999; Denvir & Brown, 1986a; 1986b; Jones, Thornton, Putt et al., 1996). The conceptualisation of the competencies is relatively consistent in this research literature.

Trial versions of the diagnostic tests were piloted, and the final tests which were administered in spring 2009 showed reliabilities of 0.96 (Year 2) and 0.97 (Year 3), measured by Cronbach's alpha (see Crocher & Algina, 1986). Both tests serve as national diagnostic tests, and they are mandatory for all Norwegian school children at the end of 2nd and 3rd school year. The total numbers of score points in the tests are 74 and 85, respectively. The student tests were marked by the teachers based on detailed coding guides, and the results (score per test page and total score) were submitted. These results were then manually typed into the statistical software used for analysis.

The Patterns of Adaptive Learning Scales (PALS) was used as a starting point in the development of teacher questionnaire. PALS (Midgley et al., 2000) use goal orientation theory as a framework. To validate the scales Midgley et al. conducted confirmatory factor analysis, and the analysis confirmed the expected model (goodness of fit indices suggested that the model fits the data well) (Midgley, Kaplan, Middleton et al., 1998). The teacher scales in PALS consist of three parts; Goal structure for students, Approaches to instruction, and Personal teaching efficacy. The scales were translated into Norwegian. Since Migdley et al. had phrased the items in terms of class or schoolwork in general, the items were adapted to measure domain-specific goals and perceptions by explicitly tailoring the items to mathematics instruction. For example, “Students are told that making mistakes is OK as long as they are learning and improving” was adapted to “Students are told that making mistakes in mathematics is OK as long as they are learning and improving”. A seven point Likert scale ranging from *totally disagree* (1) via *neutral* (4) to *totally agree* (7) was applied. The teacher questionnaire was piloted and revised before the main data collection. The teachers were also asked to respond to selected background questions on professional experience, educational background etc. They responded to the questionnaire in paper version, and the data were registered manually into the statistical software used for analysis. Table 1 presents the constructs with example items and reliabilities.

In the questionnaire, selected background questions were also asked of the teachers, e.g. age, gender, experience as teacher, education in mathematics and in mathematics education, future career perspectives etc. These variables were used as control variables in the analysis.

Table 1. Constructs with example items.

Construct	Number of items	Example item	Cronbach’s alpha
Mastery Goal Structure for Students	6	Students are told that making mistakes in math classes is OK as long as they are learning and improving.	0.72
Performance Goal Structure for Students	5	Students who do the best work in math are pointed out as an example to others.	0.73
Mastery Approaches to Instruction	6	During math class, I often provide several different activities so that students can choose among them.	0.72
Performance Approaches to Instruction	6	I encourage students to compete with each other in mathematics.	0.74
Personal Teaching Efficacy	4	I am good at helping all the students in my math classes make significant improvement.	0.75

Analysis

The analysis was conducted using the statistical software SPSS 16. Each teacher’s “generated learning outcome” was then defined as the performance of the class in which the teacher has the main responsibility of teaching mathematics. This information was asked for in the questionnaire. If the teachers stated that they had the main responsibility in several classes, the mean value of these classes was calculated. Some very few teachers without main responsibility in any class were excluded from the analysis.

Effect sizes are used in the analysis to express the differences between groups. Effect sizes are expressed as Cohen’s *d* (Cohen, 1992) where M and S denote the means and standard deviations of two arbitrarily groups being compared: Cohen’s $d = M_1 - M_2 / \sigma_{\text{pooled}}$ where $\sigma_{\text{pooled}} = \sqrt{} [(\sigma_1^2 + \sigma_2^2) / 2]$

Results of Research

Table 2 shows mean values for female and male teachers for the constructs presented in table 1. Table 2 shows that female teachers report somewhat higher levels of mastery goal structure for students and mastery approaches to instruction, while male teachers report a somewhat higher level of performance approaches to instruction. However, none of the differences between female and male teachers are statistically significant, partly due to the relatively small sample size for male teachers.

Table 2. Mean values for female and male teachers (1=totally disagree, 7= totally agree). Positive effect sizes in favour of female teachers.

	Mean female teachers *N=458*	Mean male teachers *N=62*	Cohen's d
1. Mastery Goal Structure for Students	5.64	5.48	0.22
2. Performance Goal Structure for Students	3.42	3.46	-0.03
3. Mastery Approaches to Instruction	5.68	5.52	0.23
4. Performance Approaches to Instruction	3.08	3.28	-0.19
5. Personal Teaching Efficacy	5.20	5.11	0.11

Table 3 shows the empirical relationships between the five teacher constructs and mean test scores for girls and boys in the corresponding classes. Separate results for female and male teachers are also displayed. Table 3 shows positive relationships between student scores and the constructs teacher mastery goal structures, mastery approaches to instruction and personal teaching efficacy in the group of all teachers. These relationships tend to be somewhat stronger for female students than for male students, and the relationships for female students are also statistically significant ($p < 0.05$).

The empirical findings in the group of male teachers, however, deviate clearly from the overall picture. Female students of male mathematics teachers with a strong emphasis on performance approaches to instruction tend to score somewhat higher on the tests. A corresponding tendency, however, is not established for male students. Furthermore, male students of male teachers with a high reported personal teacher efficacy tend to score lower on the tests, and the same tendency is found regarding performance goal structures for students. However, none of these tendencies are statistically significant.

Table 3. Empirical relationships between teacher constructs (see table 1) and students' math achievement (girls and boys separately).

	Correlation with Mean Score Girls	Correlation with Mean Score Boys
All teachers *(N=521)*		
1. Mastery Goal Structure for Students	0.14*	0.11
2. Performance Goal Structure for Students	0.02	-0.02
3. Mastery Approaches to Instruction	0.15*	0.10
4. Performance Approaches to Instruction	0.00	-0.01
5. Personal Teaching Efficacy	0.16*	0.09
Female teachers *(N=458)*		
1. Mastery Goal Structure for Students	0.15*	0.13
2. Performance Goal Structure for Students	0.02	0.00
3. Mastery Approaches to Instruction	0.17*	0.12
4. Performance Approaches to Instruction	-0.02	-0.01
5. Personal Teaching Efficacy	0.19*	0.13
Male teacher *(N=62)*		
1. Mastery Goal Structure for Students	0.02	-0.02
2. Performance Goal Structure for Students	0.02	-0.14
3. Mastery Approaches to Instruction	0.03	-0.02
4. Performance Approaches to Instruction	0.15	0.02
5. Personal Teaching Efficacy	-0.05	-0.25

Note. $^*p < 0.05$.

Discussion

In the present study gender differences in primary math teachers' personal goal orientations for teaching, instructional practices, and personal teaching efficacy were examined. The relationships between these constructs and student mathematics performance, i.e. male and female students' achievement, respectively, were also investigated. To date, most research within the goal orientation framework has focused older students (i.e., middle and high school levels), and there has been little systematic research on teachers' beliefs. Thus, the knowledge about relations between primary teacher beliefs and practices in mathematics and student achievement is sparse. There is limited knowledge about gender differences in teacher beliefs and the influence teacher gender may have on girls' and boys' math learning.

The present study shows relatively high values for male and female teachers' mastery goal structure for students and mastery approaches to instruction, while performance goal structure for students and performance approaches to instruction had a relatively low average in both groups. This result indicates that Norwegian math teachers in Years 2 and 3 is generally more oriented towards mastery goals than performance goals for their students, and that they are inclined to utilize instructional approaches creating learning environments that foster students' mastery orientation. In other words, students at the lowest grade levels are more strongly exposed to instructional strategies in mathematics that reflect a mastery orientation to learning. Prior research has shown grade level differences in classroom goal structures, i.e., teachers of students in higher grade levels reported using performance oriented practices more than did teachers of students in the lower grades (Anderman et al., 2001; Midgley et al., 2000). This may indicate that older students are more exposed to performance oriented instructional practices. In the present study a comparison of the different construct measurements shows some teacher gender differences. While female teachers report higher levels of mastery goal structure for students and mastery approaches to instruction, male teachers report a somewhat higher level of performance approaches to instruction. However, a significant limitation of the study is the relatively low number of male mathematics teacher in our sample, which reflects that the vast majority of teachers at this level are female.

Over the past decades there has been a great deal of research investigating teacher and student gender differences in aspects related to mathematics. For example, considerable research has examined gender differences in teachers' perceptions of their students' abilities. Early studies suggested that teachers have higher achievement expectations for boys than for girls, especially in male gender-typed domains like mathematics (Li, 1999; Meece, Glienke & Askew, 2009). However, gender differences in teacher expectancies seems to depend on grade level and appear to be more pronounced at higher grade levels. According to Turner & Meyer (2009), students' beliefs about why they are motivated to learn mathematics are connected to what they are learning (i.e., mathematical knowledge and processes), how they are learning (i.e., instruction, interaction), and where they are learning (i.e., classroom culture). Therefore the learning environment teachers create through their instructional practices and interactions with the students are essential sources for student motivation. For example, there is some evidence to suggest that girls respond more negatively than boys to competitive teaching conditions, i.e. classroom environments that focus on demonstrating high competence. Other research suggests that girls initiate more interactions with teachers and report higher achievement expectations for mathematics in classes where individualized or cooperative learning is the primary mode of instruction (Meece et al., 2009).

In the reported study, positive relationships were found between students' math achievement and the following teacher constructs: mastery goal structure for students, mastery approaches to instruction, and personal teaching efficacy. These relations tend to be somewhat stronger for female teachers–female students than for female teachers–male students. This finding may indicate that the learning environment may influence girls and boys math learning somewhat differently, and that girls achieve better under conditions dominated by mastery approaches to learning. Thus, this result supports to some degree the gender-stereotypic model, i.e. that teacher goal structures have a stronger impact on girls than on boys in classes taught by females. In Li's (1999) extensive review of the research literature dealing with gender differences, no typical pattern was found concerning the effects teacher gender may have on students' mathematics achievement. In other words, it may be the nature of pedagogy that is influential on girls' and boys' performance and not the gender of the teacher responsible for the instruction. Further analyses of our data show only neglectable differences in math performance between boys taught by male and female teachers, respectively, and the same is found for girls. According to goal orientation theory, the classroom goal structure and the instructional strategies teachers use are precursors of students' personal goal orientation, and students' perceptions of the learning environment are crucial for the goal orientation they adopt (Anderman & Midgley, 2002).

Li's (1999) review shows that female students favour female teachers, while male students tend to give male teachers higher ratings. Li also found that female students taught by female teachers demonstrated more positive attitudes towards mathematics. In the present study female teachers report higher levels of mastery goal structure for students and mastery approaches to instruction than male teachers. Therefore, it may be the combined effect of teacher gender and teacher beliefs and practice that have had a positive influence on the girls' math learning. Another interesting result from the present study is that the relationships between the teacher constructs and student math performance are clearly different for male teachers compared to female teachers. The relationships between male teacher beliefs and student achievement clearly deviate from the overall picture. It is, however, not reasonable to draw any definite conclusions from these findings because of the relatively small sample size for male teachers, and the number of male teachers in the study is too low to make generalizations. However, these findings may be a starting point for more in-depth studies of male primary math teacher's goal structures and their interaction patterns with students. The results indicate that male teachers clearly deviate from female teachers at the primary level in these respects.

In prior research within the goal orientation framework the expected positive relation between mastery goal orientation and student achievement has not been consistent. One possible explanation may be that various measurements have been utilized to assess student achievement. Meece et al. (2006) argue that most achievement measurements are not designed to assess the students' deep understanding of a content area. In the present study, students' mathematical competency in Year 2 and Year 3 was measured by tests of high quality, specially designed to assess basic numerical understanding, understanding of mathematical operations, and computational skills.

Self-efficacy theory has been widely used to understand gender differences in student motivation and achievement. Much of this research has focused on academic areas that are traditionally gender-typed as male or female domains of achievement. For example, numerous studies document that boys tend to report higher self-efficacy beliefs than girls about their performance in math, even though corresponding gender differences in male and female students' achievement have not been found (Schunk et al., 2008).

In the present study a relatively high value was registered for personal teaching efficacy for both male and female teachers, with a slight difference in favour of the female teachers. This finding indicates that Norwegian primary math teachers in general believe they contribute significantly to the academic progress for their students and that they can effectively teach all students. In comparison Midgley et al. (2000) registered a slightly lower teaching efficacy value among math teachers in grade 9. This may indicate grade level differences in teaching efficacy, with higher efficacy beliefs among teachers at lower grade levels. This may be due to the fact that academic content grows more complex and difficult. Therefore teachers' sense of efficacy for subject teaching may become increasingly important during the lower secondary grades and beyond. However, several surveys show that teachers' efficacy beliefs increase with experience (Hoy, Hoy & Davis, 2009). In the present study a significant positive relation is registered between female teachers' efficacy beliefs and female students' math achievement, while the relationship between male teachers' beliefs and student performance deviates from this pattern. In fact, boys taught by male teachers with high personal teaching efficacy perform poorer. As mentioned earlier, the results related to the male teachers in this study may be due to the relatively small sample size for male teachers. According to social cognitive theory, teachers' personal efficacy beliefs influence the same types of activities that student self-efficacy affects (Bandura, 1997). While teachers high on teaching efficacy believe they can enact certain teaching strategies and have effect on student learning and motivation, teachers with low efficacy tend to believe they cannot use these strategies and doubt whether they really can have an effect on students. Efficacy beliefs may also refer to perceptions of controllability. A teacher might have low teaching efficacy if (s) he believes that most students' learning is due to home or other factors outside of the teacher's control (Guskey & Passaro, 1994). Teachers who feel control invest energy in their teaching, set optimal goals for their students, are persistent in their endeavours, and resilient when confronting obstacles (Malmberg, 2008).

Conclusions

Primary teachers may pursue different goal orientations in their teaching, and through their instructional practices they signal to students that the point of school work is to learn and progress, or to perform better. Several studies provide evidence that students adopt the goal orientation emphasized through teacher's use of instructional strategies, and the importance of students' perceptions of the learning environment is underlined. To date, the knowledge about teachers' beliefs and instructional practices in mathematics at the lowest primary grade levels is limited. In addition, studies focusing on differences in the learning environment created by male and female teachers through their use of teaching strategies are sparse. However, research findings show that female teachers tend to be more student-centred and supportive of students than male teachers. In the present study female teachers report somewhat higher levels of mastery goal structure for students and mastery approaches to instruction, while male teachers report a somewhat higher level of performance approaches to instruction. Positive relationships were also found between students' math performance and female teachers' mastery orientation, mastery approaches to instruction and teaching efficacy, respectively. These relations are somewhat stronger for girls than for boys. For the male teachers the relationships between the teacher constructs and student math performance are clearly different. The relatively small sample of male teachers constitutes a serious limitation for the interpretation of these findings. The gender differences that were registered may, however, serve as an interesting starting point for further research. In future studies qualitative research methods should be included, and female and male teachers' interaction with female and male students should be explored more closely.

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